

Transverse Rumble Strips

What are transverse rumble strips?

Transverse rumble strips are grooves cut into the pavement that act as a warning device. When driven over, the strips create noticeable sound and vibrations to warn drivers of an approaching intersection where they must slow down or stop.

There are two basic layouts for transverse rumble strips; extending across the entire traffic lane or placement only in the wheel tracks. The wheel track layout is preferred because it allows drivers that do not need additional warning to avoid the rumbles without having to drive into the opposing lane.



How effective are transverse rumble strips?

Transverse rumble strips are intended to address the unintentional running of a STOP sign¹. However, this represents only one of several common scenarios for right-angle crashes at rural through-stop intersections³. For example, transverse rumble strips will not benefit drivers who have stopped, but misjudge gaps in traffic as they pull out onto the highway.



Drivers are more likely to slow down when approaching through-stop intersections that have transverse rumble strips⁴. However, the results of crash studies are inconsistent, sometimes showing decreases, increases, and roughly no change. Consequently, transverse rumble strips would not necessarily reduce the number or severity of right-angle crashes, at all locations. With respect to the factors that contribute to right angle crashes at typical rural intersections, misjudging gaps in traffic is associated with more than two-thirds of these crashes. Transverse rumble strips would not be an effective solution in these cases.

Key Functions

Drivers receive a warning through the noise and vibrations generated by the rumble strips, which:

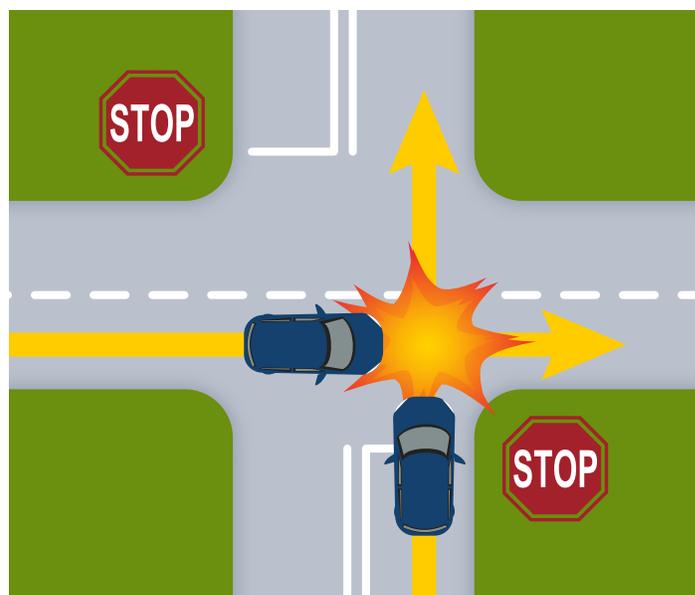
- Increases awareness of upcoming roadway changes
- Alerts drivers to reduce speed when approaching the intersection
- Attempts to reduce unintentional running of a STOP sign

What is the purpose of using transverse rumble strips?

The purpose of the rumble strips is to capture the driver's attention. The noise and vibration produced by the transverse rumble strips alert drivers of upcoming roadway changes so they do not unintentionally run a STOP sign, an action that could result in the injury or death of vehicle occupants.



"It is concluded that the frequency of crashes at rural intersections is independent of the presence or absence of rumble strips."⁵



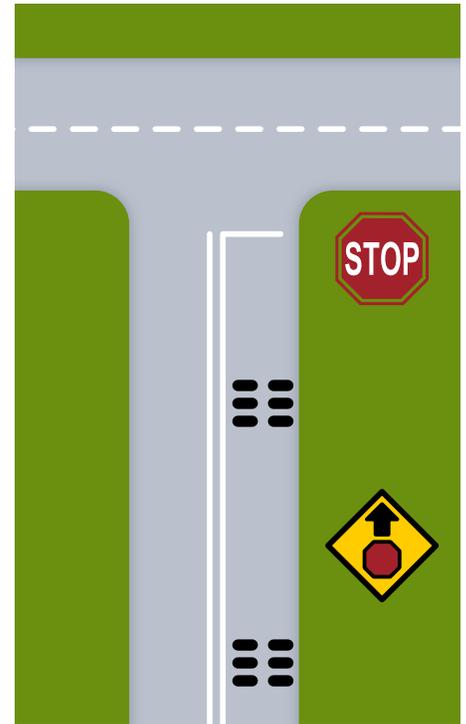
What is the transverse rumble strip design?

Typical designs of transverse rumble strips are either across the lane or exclusively in the main wheel path. Most commonly, this warning device is placed in route to an approaching intersection with a STOP sign along rural roadways. Installation of transverse rumble strips neither improves nor diminishes the operational performance of rural intersections; but acts as a warning device intended to alert the driver of an upcoming change in driving conditions.

What are the most suitable situations for transverse rumble strips?

Due to both the inconsistent documented effectiveness and the low density of severe crashes at rural through-stop intersections, installing transverse rumble strips reactively in response to a severe crash is likely the least effective approach. Instead, a potentially more effective approach would involve installing them at intersections identified as high-risk based on the presence of certain roadway and traffic characteristics, including:

- Intersections with visual obstructions caused by man-made structures (especially commercial landscape), road geometry (curves), and topography (hills)
- Approaches to intersections along roadways that rarely have a STOP sign (more than five miles from the last STOP sign)
- Intersections with history of unintentional run the STOP crashes (more than one in a five year period)



Cost

Per Intersection: \$2,000 - \$3,000

Includes a two-leg approach stop to the intersection.

The cost primarily involves operating the machinery to cutting the grooves into the pavement.

In order to continue providing original level of noise and vibrations, grooves need to be re-cut every 3 to 6 years (more frequently on roads with higher traffic volumes and pavement wear).

Are there additional considerations for transverse rumble strips?

A disadvantage of traditionally-cut transverse rumble strips is that noise may affect nearby residents. The noise impact of their implementation near residential areas should be evaluated before installation. Also, rumble strips gradually lose their effectiveness due to wear and should be monitored and maintained in order to provide original levels of noise and vibration. **END**

References

- 1 Federal Highway Administration (FHWA). 2012. *Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections in Rural Areas*. FHWA-HRT-12-047. <http://www.fhwa.dot.gov/publications/research/safety/hsis/12047/index.cfm>. Accessed June 2017.
- 2 Texas Department of Transportation (TxDOT). 2003. *Left-Turn and Transverse Rumble Strip Treatments for Rural Intersections*. FHWA/TX-04/0-4278-2. <https://static.tti.tamu.edu/tti.tamu.edu/documents/0-4278-2.pdf>. Accessed June 2017.
- 3 Preston, H. 2003. *Reducing Crashes at Rural Thru-Stop Controlled Intersections*. Mid-Continent Transportation Research Symposium, Ames, IA. <https://trid.trb.org/view.aspx?id=665430>. Accessed June 2017.
- 4 Minnesota Department of Transportation (MnDOT). 2006. *Stopping Behavior at Real-World Stop-Controlled Intersections with and without Transverse Rumble Strips*. MN/RC-2006-42. <https://www.lrrb.org/pdf/200642.pdf>. Accessed June 2017.
- 5 Carstens, R.L. 1982. *Warrants for Rumble Strips on Rural Highways*. ISU-ERI-Ames-83002. http://publications.iowa.gov/17338/1/IADOT_hr235_Warrants_Rumble_Strips_Rural_Hwys_1982.pdf. Accessed June 2017.
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