

## Topic: Transverse Rumble Strips

### What are Transverse Rumble Strips?

Transverse rumble strips or in-lane rumble strips are raised or depressed panels or sections on the pavement that provide audible and tactile warnings to drivers when approaching a decision point. Typical designs of transverse rumble strips are either across the entire lane or exclusively

in the main wheel path of the lane.

The most common applications of this warning device include placement on an approach to stop-controlled intersections along high-speed rural corridors and temporary use in construction zones. The purpose of any rumble strip is to attract the attention of the driver; the noise and vibration produced by the in-lane rumble strips when vehicles travel over them alert drivers to be aware of potential changes in traffic conditions ahead. The goal of installing transverse rumble strips in advance of rural intersections is to reduce the

frequency of the unintentional running of STOP signs. The purpose of installing transverse rumble strips in advance of work zones is to alert drivers of flaggers/workers and some type of lane adjustments, transitions, splits, drops, etc. The primary difference between these two applications is that construction zone rumble strips are generally temporary and are removed after the construction has been completed.

### How effective are Transverse Rumble Strips?

The goal for most uses of transverse rumble strips is to reduce the occurrence of vehicles running a stop-controlled intersection which in turn should theoretically increase the stop compliance. A previous study of transverse rumble strips approaching rural intersections in Minnesota and North Carolina showed a reduction in approach speeds ranging from 2 - 4 mph. Crash modification factors (CMFs) associated with transverse rumble strips vary from 0.5 to 1.2 for all severity types of crashes. The large variability of CMFs comes from statistically insignificant results due to the small sample size. Additionally, a study in Iowa by R. L. Carstens in 1983 concluded similar results of implementing transverse rumble strips at rural intersections. These results came from a much larger sample size, yet the outcome is still variable on how well the rumble strips perform. The notion of transverse rumble strips was that it would be a solution to vehicles running the stop sign but after a study in Minnesota (*Reducing Crashes at Rural Thru-STOP Controlled Intersections*) it was concluded that the majority of the right-angle, intersection related crashes

### Key Points

- Intended to reduce the unintentional run-the-stop intersection crashes through audible and tactile warning
- Effectively reduces approach speeds to rural intersections
- Increases stopping compliance



Source: Minnesota Department of Transportation (MnDOT)

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were from vehicles stopping and then pulling out into traffic where transverse rumble strips had been implemented.

### **How do Transverse Rumble Strips operate?**

Installation of transverse rumble strips does not improve nor diminish the operational performance of rural intersections. The purpose of this strategy acts as a warning device (audibly and tactilely) to alert the driver of an upcoming decision point.

### **Where is the best place for Transverse Rumble Strips?**

States that use transverse rumble strips have deployed them on approaches to rural intersections, construction zones, approaching horizontal curves, approaching reduced speed zones or tolling facilities. Transverse rumble strips that are installed in work zones are typically temporary and are removed once the construction has been completed. Rural intersections with visual obstructions may also be appropriate locations for installing transverse rumble strips.

### **How expensive are Transverse Rumble Strips?**

The most expensive cost associated with transverse rumble strips is the labor for installation. Operating the machinery to cut grooves or plant raised strips is the majority of the cost. Typical costs of installation are in the range of \$2,000 to \$3,000 per intersection.

### **What are some design considerations?**

There should be a minimum of three sets of transverse rumble strips on any approach to an intersection. At least one set should be located 100 to 200 feet before the STOP-Ahead sign, one set at the STOP-Ahead sign another halfway between the STOP-Ahead and STOP signs. The rumble strips can either span the entire length of the lane or only be placed in the wheel path.

### **Other Considerations**

Transverse rumble strips are not intended to be a speed control device. However, studies have shown that vehicle speeds approaching intersections with transverse rumble strips installed is reduced and that stopping compliance is increased.

### **References**

FHWA. *Safety Evaluation of Transverse Rumble Strips on Approaches to Stop-Controlled Intersections in Rural Areas*. 2012. (FHWA-HRT-12-047)

TxDOT. *Left-Turn and In-Lane Rumble Strip Treatments for Rural Intersections*. 2003. (FHWA/TX-04/0-4278-2)

MnDOT. *Stopping Behavior at Real-World Stop-Controlled Intersections with and without In-Lane Rumble Strips*. 2006. (MN/RC-2006-42)