



Kansas LTAP Fact Sheet

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Temporary Rumble Strips Help Workers Feel Safer

By Lisa Harris



Kansas DOT

KDOT places the rumble strips in advance of the action warning sign at a work zone. The idea is that drivers will hit the strips and look up to see the sign.



KDOT has heard from workers on its projects that distracted drivers are an issue in KDOT work zones. These drivers are not paying attention, and they sometimes approach an active work zone area at a high speed. To address this concern, KDOT crews and contractors are now using portable rumble strips at some locations to get drivers' attention. This article will describe the types of rumble strips used and spec'd by KDOT, and what to consider when purchasing temporary rumble strips for particular situations.

Types of temporary rumble strips

Types of rumble temporary rumble strips available range from raised asphalt strips applied across the roadway, which are later removed, to devices that are transported to the job site and can be used again and again. ATSSA has a guidebook that describes the common types of these removable devices. (see sidebar). Some of the devices are applied with adhesive and some stay in place on their own. KDOT uses the latter.

Kristi Ericksen, KDOT work zones engineer, said that there are a few vendors for temporary rumble strips that don't require adhesive, but KDOT chose Plastic Safety Systems Inc. (PSS) because it was the only vendor that met KDOT's specs. TxDOT also uses this vendor.

KDOT uses two PSS models: one that comes in three pieces

to be assembled at the job site, and another, one-piece unit that hinges in the middle and does not need assembly. The width of the shoulder at the job site dictates which model to use. The three-piece model needs sufficient shoulder space to be able to be assembled and provide sufficient safety for the workers doing the assembly.

Are temporary rumble strips effective?

Ericksen said that the temporary rumble strips are "an extremely effective tool" to get the attention of distracted drivers. She noted that the rumble strips are especially useful for situations where you are stopping traffic unexpectedly, such as for short term-projects. She said they can help reduce the incidence of back-of-queue crashes.

The strips are placed in advance of an action warning sign at a work zone. The idea is that drivers will hit the strips and look up to see the sign, Ericksen said.

Workers on KDOT jobs are noticing a difference. "Our crews tell me that they notice drivers slowing down as they drive over the strips," she said. "They tell me they feel safer working out there as a result."

Joe Engle, Pittsburg Area maintenance supervisor for KDOT, said his crew likes the strips, especially when working on roads 30 ft. wide or less, because the "lead-in cones ... are constantly being hit on these narrow roadways." The strips provide an extra measure of safety.

KDOT's considerations in purchasing

Below were the major considerations for KDOT when purchasing their rumble strips:

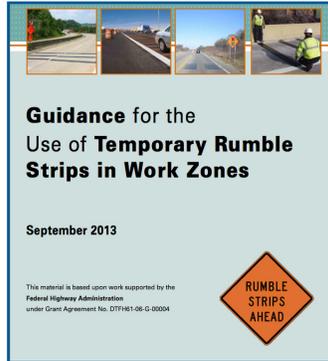
Adhesive or no. KDOT prefers the non-adhesive type of strip for ease of installation and removal.

Ability of the strip to stay in place under traffic. This is an important consideration with the traffic volumes KDOT sees on the state system. Engle's crew recently tested the strips at an asphalt patching work site, and noted a negligible 1.5 inches of movement after counting 38 cars/pickups, 20 semis and 3 buses passing over the strips.

Safety for assembly. As mentioned above, KDOT has been using two different styles of temporary rumble strips. One is a three-piece model, with each piece weighing about 33 lb. This model must be assembled in the shoulder before being dragged onto the road. Another is a hinged model, weighing about 110 lb., that can be carried and placed by two people.



The American Traffic Safety Services Association (ATSSA) has an excellent and very comprehensive guidebook on the use of temporary rumble strips in work zones. The guidebook covers benefits and limitations of several different types of temporary rumble strips; when and how to implement temporary rumble strips in work zones; and key considerations before and during implementation. Anyone considering purchasing temporary rumble strips should read this guide. You can download it for free. See the link in the Sources below.



Kansas Research on Temporary Rumble Strips in Work Zones

The University of Kansas has some research on portable rumble strips for K-TRAN research projects published in 2006 and 2011. See Sources below for information on how to access these reports.

The first study, titled *Guidelines for the Application of Removable Rumble Strips*, was authored by Eric Meyer and was designed to assess the viability of two types of removable rumble strips as replacements for asphalt rumble strips, particularly in short term highway work zones. The removable strips were compared with asphalt strips in terms of the levels of in-vehicle noise, vehicle-body vibration, roadside noise, their effect on vehicle speeds, and their cost, durability, and installation and removal processes. Of the configurations tested, 6 strips with a center-to-center spacing of 2 ft. was the preferred configuration based on the sound and vibration levels produced. The results of the comparisons indicated that the removable rumble strips tested are similar to asphalt rumble strips in terms of the sound and vibration levels produced and the speed reductions observed. With certain limitations, these removable rumble strips are a viable alternative to asphalt rumble strips.

The second study, titled *Evaluation of Innovative Traffic Safety Devices at Short-Term Work Zones*, authored by Wang, Schrock, Bai and Rescot, included a field test for a portable plastic rumble strip. The field study was to investigate the effects of the rumble strips and drivers' response to them at three short-term maintenance work zones in Kansas. The results showed that the effect on speed reductions was more significant on cars than on trucks. The strips reduced car speeds by 4.6 to 11.4 miles per hour. They also created 5.0 to 11.7 miles per hour mean speed reduction for trucks, but the reductions were only at two test sites. It was observed that 30 to 80 percent of truck drivers activated their brakes (indicated by brake light illumination) when they approached the rumble strips. In addition, about five percent of car and truck drivers swerved around the strips. This indicates that additional signage or other supplemental traffic devices would be needed when the temporary rumble strips are implemented.

There is a hand-hold at each end of the strip (see photo on previous page). KDOT's maintenance crews are switching over to the hinged model to eliminate the need for assembly in the shoulder, and the risk associated with that.

Traffic speed. Speed affects the driver's experience of the strip. At higher speeds, you need a strip with a higher profile so it can be felt and make sufficient noise. In lower speed situations, and especially near residential areas, you may want to use a lower profile device that can still be felt by drivers but will make less noise.

Traffic volume. Temporary rumble strips do wear out over time, and some devices can shift around with traffic.

Durability. The strips KDOT uses each last about five years, said Ericksen. A few have been damaged, but the manufacturer stood behind the warranty for those devices that failed early in their service lives, she said.

For more information

Ericksen would be happy to answer any questions about KDOT's use of temporary rumble strips. You can reach her at (785) 296-0355 or at Kristie@ksdot.org. ■

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Sources:

- ATSSA. *Guidance for the Use of Temporary Rumble Strips in Work Zones*. 2013. http://www.workzonesafety.org/files/documents/training/fhwa_wz_grant/atssa_temporary_rumble_strips.pdf.
- Meyer, Eric. *Guidelines for the Application of Removable Rumble Strips*. 2006. Available from the Kansas DOT Research Reports Catalog at <http://ksdot1.ksdot.org/burmatrres/kdotlib2.asp>. Search for "removable rumble strips."
- Wang et al. *Evaluation of Innovative Traffic Safety Devices at Short-Term Work Zones*. 2011. Available from the Kansas DOT Research Reports Catalog at <http://ksdot1.ksdot.org/burmatrres/kdotlib2.asp>. Search for "innovative traffic safety."
- Interviews with Kelly Gaer and Kristi Ericksen on June 27, 2014.