



Montana Department of Transportation
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Memorandum

To: e-Distribution

From: Dwane Kailey, P.E. signed by Dwane Kailey 7/13/15
Chief Engineer
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Date: July 8, 2015

Subject: Rumble Strip Guidance

Introduction

With Vision Zero (zero fatalities/zero serious injuries) as the goal for the highway users in the State of Montana, there is a need to update the rumble strip installation practice for Montana's highways for both the motorist and non-motorist. The following guidelines will replace all previous rumble strip guidance and policies. These guidelines include criteria for shoulder and centerline rumble strips and information on rumble strip configuration, location and noise reduction. In addition, these guidelines contain considerations for bicycle use in the decision to install rumble strips.

Nationwide research indicates that the number of roadway departure crashes is reduced through the use of rumble strips. With roadway departure crashes (run-off-the-road, head-on and opposite direction sideswipe crashes) documented as the highest percentage of crash type for Montana's highways, installation of rumble strips can help Montana reach its goal of Vision Zero.

Deviation from these guidelines should be documented in the appropriate project report.

Shoulder Rumble Strips - Installation

Install rumble strips in accordance with the dimensions and locations described in the table shown below and in conjunction with the MDT Detailed Drawings or project plan details.

Rumble Strip Installation Table

Roadway Type	Paved Top Width	Paved Shoulder Width	Rumble Strip Lateral Width	Rumble Strip Location
Interstate Routes	All	All	12"	Offset 6" from outside edge of the shoulder stripe (ensure at least 4 feet of paved shoulder between the rumble strip and the edge of the shoulder)
National Highway Primary and Secondary Routes	Typically – 40 foot	Greater than 4-Feet	12"	Offset 6" from outside edge of the shoulder stripe (ensure at least 4 feet of paved shoulder between the rumble strip and the edge of the shoulder)
	Typically – 32 foot	Equal to 4-Feet	6"	Abuts shoulder stripe (drawing to be provided in design plan)
	Typically – 28 foot	Greater than 1-foot and less than 4-feet	Determination made by Rumble Strip Committee (drawing to be provided in design plan)	
	Typically – 24 foot	1-foot and less	Rumble strip generally not installed unless Rumble Strip Committee recommends it.	

Interstate

Provide rumble strips on left and right shoulders of all interstate new construction, reconstruction, rehabilitation and overlay projects unless there is a specific reason not to do so. Document these reasons in the Scope of Work (SOW) Report. The rumble strips on the outside shoulder will utilize an intermittent pattern and the rumble strips on the median shoulder will be continuous as indicated in the MDT Detailed Drawings.

National Highway, Primary and Secondary Routes

Where the shoulder width is greater than or equal to 4 feet, provide rumble strips for all new construction, reconstruction, rehabilitation and overlay projects, subject to the restrictions within urban and residential areas. Where the decision is made to not use rumble strips, document the justification in the SOW Report.

For multi-lane highways divided by a depressed median, follow the guidelines for Interstate rumble strip installation.

Accommodating Bicycle Users

The ideal clear space between the shoulder rumble strip and the edge of the paved shoulder is 4'. As shown in the Rumble Strip Installation Table, the 4' of clear space should be easily attainable for highways that are 40' wide.

For those highways that are 32' wide (4' shoulders), the clear space provided will most likely fall short of providing the 4' clear shoulder width. Often, this reduced width is acceptable. Two ideas that could be considered to provide additional useable space for bicyclists, if determined to be necessary, are: to reduce the lane width by 6" or move the rumble strip over on top of the stripe to create a rumble stripe. Both options would approach the ideal clear space of 4' to better accommodate bicyclists.

For all new construction, reconstruction, rehabilitation and overlay projects where the shoulder width is less than 4 feet but greater than 1 foot (typically a 28' highway), the following procedure will need to be completed:

- 1) A safety evaluation of the highway segment that targets roadway departure crashes utilizing the benefit/cost methodology will be completed to determine if rumble strips are justified; and
- 2) An evaluation by the Planning Division to determine how the highway or highway segment is used from the bicycle users viewpoint, i.e., shown as a bicycle route maps, or other method that would show a prioritization.
- 3) If the safety evaluation shows that rumble strips are justified and the bicycle route evaluation demonstrates a high priority bicycle route then a Rumble Strip Committee meeting will be convened by the Project Design Manager. The goal of the meeting will be to evaluate the route and to recommend the appropriate action that would be documented in the appropriate report such as the SOW report.

The members of the committee will include members from: Traffic & Safety Bureau; Planning Division; Highways Bureau and District. Other divisions can be included on as-needed basis. The committee will discuss various options for accommodating bicyclists while maintaining roadway safety. These options might include but are not limited to: different rumble strip configuration and/or placement, move rumble strip into the edge line to create a rumble stripe; reduce the depth of rumble strip to 3/8", different lane configurations, or other options deemed appropriate to balance the safety of the motoring public and bicyclist. The options and the recommendations

from the committee will be documented in the milestone reports, and finalized in the Scope of Work report.

For any option that narrows the lane width from the standard 12', a design exception report will be required.

Urban/Residential Areas

Rumble strips have often been terminated through residential and urban areas due to the nuisance noise from incidental contact. However, rumble strips could be placed on highways where the distance to the residences is adequate to minimize the adverse effect of rumble strip noise; research indicates this is greater than 650'. The decision to not install rumble strips should be documented in the appropriate project report.

Two options are available to decrease rumble strip noise through residential/urban areas.

- 1) The depth of rumble strip of 5/8" is typically used. The depth of a rumble strip can be reduced to minimum of 3/8" to provide a "quieter" pattern near residential areas. The 3/8" depth will not provide adequate noise/vibration after a chip seal has been placed, so the rumble strip would have to be remilled after every chip seal. Depths shallower than 3/8" are not recommended as they do not provide enough noise/vibration to alert the errant driver.
- 2) Increase the offset from the edge of the shoulder stripe by an additional 6" (total of 1 foot from shoulder stripe). A greater offset can be beneficial where there is substantial truck traffic, because trucks tend to crowd the shoulder resulting in more "nuisance" contact.

General Considerations/Miscellaneous Details

Install rumble strips in accordance with the dimensions and locations described in the MDT Detailed Drawings, unless modifications discussed elsewhere in this guidance memo are implemented.

Rumble strips are generally not installed where the posted speed limit is 45 mph or less.

The installation of rumble strips is encouraged on chip seal projects where there are no existing rumble strips. The installation of rumble strips may be required on chip seal projects, when the chip seal reduces the depth of the existing rumble strip to the point where the rumble strip will not produce sufficient noise/vibration to alert the errant driver.

For two-lane, two-way highways discontinue rumble strips across the full width of all public road approaches. Rumble strips should be installed along the full length of farm field and private approaches, tapers, mailbox turnouts, scenic turnouts, chain-up areas, etc.

Where guardrail exists, the use of rumble strips on outside shoulders less than 6 feet wide should be evaluated and the decision documented in the appropriate report.

Centerline Rumble Strips (CLRS)

Centerline rumble strips function the same as shoulder rumble strips, but target crashes where the driver has departed the lane to the left. MDT completed a roadway departure crash study on their highways utilizing principles from the Highway Safety Manual. From this study, the Department will begin installing CLRS on rural two lane highways. Other highway segments may be added as determined by the Safety Engineering Section.

MDT Detail Drawings show a CLRS detail and should be used in all locations unless documented in the scope of work report for use of a different design.

If you have questions concerning this, please contact Lesly Tribelhorn at 444-6242 or Roy Peterson at 444-9252.

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