

Shoulder and Centerline Rumble Strips

Design Manual

Chapter 3

Chapter Title

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This section was developed using information provided by NCHRP Report 641, "Guidance for the Design and Application of Shoulder and Centerline Rumble Strips", as well as recommendations made by InTrans report "Iowa Lane Departure Strategic Plan, Chapter 2: Centerline Rumble Strips" approved at the Highway Division Management Team (HDMT) meeting on February 25, 2010.

Rumble Strips and Rumble Stripes

Milled rumble strips (or just "rumble strips") are transverse grooves milled into a pavement surface. See Standard Road Plans [PV-12](#) and [PV-13](#) for details. The noise and vibration that results from vehicles crossing over them alerts drivers that corrective action may be needed. Figure 1 is a photograph of a rumble strip.



Figure 1: Rumble strips.

Rumble stripes are rumble strips that have pavement markings placed over them after milling. Figure 2 is a photograph of a rumble stripe.



Figure 2: Rumble stripes.

For the purpose of general discussion, this section will refer to both rumble strips and rumble stripes as rumble strips.

Shoulder Rumble Strips

Single vehicle run-off-road crashes account for a large percentage of traffic fatalities. Shoulder rumble strips (see Standard Road Plan [PV-12](#)) have demonstrated a tremendous ability to reduce run-off-road crashes.

Shoulder rumble strips must be placed on all new or existing Primary rural roads with paved shoulders at least 2 feet wide. They may also be placed on roads with narrower shoulder widths, including roads without paved shoulders where, in the opinion of the designer, the benefits of the rumble strips would outweigh their operational constraints. In these situations, the width of the rumble strip may be reduced and/or combined with a pavement marking.

The standard shoulder rumble strip width is 12 inches. This width should be used wherever feasible. In some circumstances, a narrower width (preferably no less than 8 inches, but absolutely no less than 6 inches) may be beneficial to accommodate bicyclists and/or horse drawn carriages, or to maximize lane width on narrow pavements (e.g. to accommodate two 11 foot lanes on a 24 foot wide pavement). Another option is to place a rumble stripe.

On highways where bicyclists are legally allowed, a gapped rumble strip pattern consisting of 48 feet of rumble strips followed by a 12 foot gap will be provided to allow cyclists to cross over, see Standard Road Plan [PV-12](#). Figure 3 is a photograph of a gapped shoulder rumble strip.



Figure 3: Gapped shoulder rumble strip pattern.

A minimum of 4 feet of pavement should be provided outside of the rumble strip to accommodate bicyclists, see Figure 4. A minimum of 5 feet should be provided if the shoulder is adjacent to a barrier or a railing.

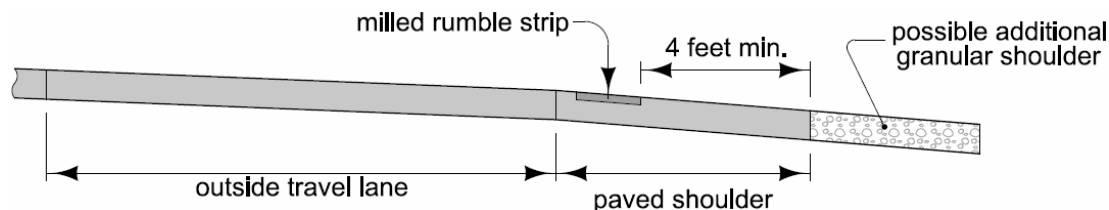


Figure 4: Bicycle accommodation on paved shoulders.

This may require the use of narrower shoulder rumble strips or placing the shoulder rumble strip within the pavement marking (creating a rumble stripe), or both.

Expressways should have a gapped pattern on the outside shoulders, but have continuous (ungapped) rumble strips on median shoulders. Interstates, however, will have continuous rumble strips on both outside and median shoulders.

Centerline Rumble Strips

Centerline rumble strips (see Standard Road Plan [PV-13](#)) have demonstrated the ability to reduce multi-vehicle cross centerline crashes and single vehicle run-off-road left crashes. Rumble strips placed along the centerline are in line with the centerline pavement markings, so they become rumble strips. Figure 4 is a photograph of centerline rumble strips.



Figure 4: Centerline rumble strip pattern.

Centerline rumble strips must be placed on all new or existing two lane Primary rural roads with at least 11 foot lane widths. They may also be placed on roads that do not meet this qualification, but have experienced a history of cross centerline crashes.

Note: Centerline rumble strips are not to be used on Interstates or expressways.

Gaps

Gap shoulder rumble strips at pedestrian crossings, driveways, side roads, ramp and loop terminals, and bridges as shown on Standard Road Plan [PV-12](#). Gap centerline rumble strips at intersections and bridge approaches as shown on Standard Road Plan [PV-13](#).

In some situations, shoulder rumble strips may need to be omitted to mitigate noise near homes or businesses. This is especially important for roadways that transition from rural to more densely populated areas. NCHRP Report 641 suggests the end distance prior to residential or urban areas be 660 feet.

Bidding Shoulder and Centerline Rumble Strips

Tab [112-10](#) is used to tabulate shoulder and centerline rumble strips. Typically, they are bid as beginning of construction to end of construction. Gaps such as those shown on Standard Road Plan [PV-12](#) and [PV-13](#) do not need to be accounted for in Tab [112-10](#). However, longer gaps, e.g. those to mitigate noise near homes or businesses, may need to be accounted for in Tab [112-10](#), depending on the length of the gap relative to project length.

Chronology of Changes to Design Manual Section: 003C-005 Shoulder and Centerline Rumble Strips

| | |
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| 7/27/2021 | Revised Added information regarding bidding rumble strips. |
| 2/18/2020 | NEW Added more information regarding bicycle accommodation. |
| 6/25/2019 | Revised Added information to Shoulder Rumble Strips subsection to provide a minimum of 4 feet of pavement outside of rumble strips to accommodate bicyclists. |
| 3/20/2018 | Revised Retitled. Eliminated volume thresholds for centerline rumble strips. Reorganized information to read better. |
| 7/18/2013 | Revised Revise conditions for when rumble strips must be placed from 3000 current ADT to 3000 design year ADT. Request made by Office of Traffic and Safety. |
| 5/8/2013 | Revised Clarify PV-12 is used for all projects except those with 14' PCC lanes adjacent to granular shoulders. |
| 12/19/2012 | Revised Reworded to clarify when projects meet conditions for centerline rumble strips, they are required. |
| 6/15/2010 | Revised Added centerline rumble strip info. |