



Milled Rumble Strips

Design Manual

Chapter 3

Cross Sections

Originally Issued: 01-23-04

Revised: 07-18-13

This section was created 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 Management Team (HDMT) meeting on February 25, 2010.

Rumble Strips versus Rumble Stripes

Rumble stripes are rumble strips that have pavement markings over them. In Iowa, rumble strips placed in the shoulder are generally offset enough from the edge line to stay rumble strips, while rumble strips placed in the centerline are placed such that they become rumble stripes. For purposes of general discussion, this section will refer to both as rumble strips.

Milled Centerline Rumble Strips

Milled centerline rumble strips are transverse grooves that are placed along the centerline of an undivided roadway. These devices can be installed on new or existing HMA or PCC pavements. Using noise and vibrations, centerline rumble strips alert drivers whose vehicles are crossing the centerline that corrective action is needed. Centerline rumble strips have demonstrated the ability to reduce multi-vehicle crossed centerline (MVCC) and single-vehicle run-off-road left (SVROR Left) crashes. Figure 1 is a photograph of milled centerline rumble strips.



Figure 1: Gapped milled centerline rumble strip pattern.

Milled centerline rumble strips must be placed if a project falls under either of the following conditions:

- 1) All two-lane primary roads with greater than 3,000 design year ADT with 2 foot or wider shoulders and at least 11 foot lane widths.
- 2) All identified 5% cross centerline crash corridors with 2 foot or wider shoulders and at least 11 foot lane widths, as they are resurfaced.

In addition, Districts should retrofit all projects identified in the 5% cross centerline corridors if resurfacing was completed in the last 5 years.

An overview of the 5% program, as well as the descriptive listing of corridors identified as the top 5% cross centerline severe safety needs, can be found here:

<http://www.iowadot.gov/crashanalysis/fivepercent/fivepercentneeds.htm> > *Rural Two-lane Highway Multi-Vehicle Cross Centerline* > *(most recent data)*

For milled centerline rumble strips on any project, use Standard Road Plan [PV-13](#). Centerline rumble strips are not to be used on interstates or expressways.

Milled Shoulder Rumble Strips

Single-vehicle run-off-the-road (SVROR) crashes account for a large percentage of traffic fatalities. Milled shoulder rumble strips have demonstrated a tremendous ability to reduce run-off-the-road crashes. Figure 2 is a photograph of milled shoulder rumble strips.



Figure 2: Milled shoulder rumble strips.

On highways where bicyclists are legally allowed, a gapped pattern will be provided to allow cyclists to cross over (see Figure 3).



Figure 3: Gapped shoulder rumble strip pattern.

Use Standard Road Plan [PV-12](#) for all projects except those involving 14 foot PCC lanes adjacent to granular shoulders, in which case Standard Road Plan [PV-11](#) should be used.

Interstates will have continuous rumble strips on both outside and median shoulders. Expressways should have continuous rumble strips on median shoulders, but have a gapped pattern on the outside shoulders. When used on two-lane roadways, milled shoulder rumble strips should have a gapped pattern.

Due to constraints, some highways may have paved shoulders less than four feet wide. Rumble strips are normally not placed on paved shoulders that are less than four feet wide. However, if a history of run-off-the-road crashes exists, rumble strips can be considered.

Gaps

A gapped pattern consisting of skipping every third centerline rumble is used to help drivers differentiate between the shorter milled section of centerline rumble strips and the longer milled section of shoulder rumble strips. Differentiating between the two hopefully breaks the conditioning of a driver to always veer left when traveling over rumble strips, which in the case of centerline rumble strips would be the opposite of the desired effect. Gap centerline rumble strips at intersections and bridge approaches as shown on Standard Road Plan [PV-13](#). Gap shoulder rumble strips as shown on Standard Road Plan [PV-12](#).

The determination of where to end rumble strips prior to residential or urban areas, as well as whether to gap for driveways, is up to the District Engineer. NCHRP Report 641 suggests the end distance prior to residential or urban areas be 660 feet. The report does not suggest a gap distance for driveways.

Chronology of Changes to Design Manual Section:

003C-005 Milled Rumble Strips

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| 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. |