South Carolina Department of Transportation

Engineering Directive

Directive Number:	**ED-53**	**Effective: April 15, 2025**
Subject:	**Installation of Rumble Strips**	
References:	**SCDOT Highway Design Manual** **NCHRP Report 641: Guidance for the Design and Application of Shoulder and Centerline Rumble Strips (2009)** **AASHTO Guide for the Development of Bicycle Facilities (4th Edition)**	
Purpose:	**To provide direction for Selection and Installation of Rumble Strips**	
Primary Department:	**Traffic Engineering**	

This directive provides guidance on the installation of rumble strips on the South Carolina Department of Transportation's (SCDOT) state highway system. Rumble strips are a proven, cost-effective way to help prevent lane departure crashes. They are used to alert drivers of lane departures by providing an audible and vibratory warning. Nationwide, lane departure crashes historically account for nearly 60 percent of all fatal crashes with South Carolina ranking high as a focus state for reducing these crash types.

The installation of rumble strips shall be accomplished through several methods as described below:

1. Milled-in Rumble Strip – Involves milling or cutting grooves in pavement in a continuous or skip pattern. Rumble Strips are typically installed on the shoulders, edgeline, and the centerline.

2. Sinusoidal Rumble (Mumble) Strip - Where noise concerns of typical milled-in rumble strips may need to be mitigated, The Department may consider a design using an oscillating sine wave pattern known as "mumble strips" which reduces noise outside of the vehicle. Please see the sinusoidal consideration criteria below.

3. Rumble Stripe – A rumble stripe (or mumble stripe) is defined as a milled-in rumble strip or sinusoidal rumble strip that also contains a pavement marking stripe. After rumble or mumble strips are milled in, the pavement marking is applied on top of the rumble or mumble strip. Rumble or mumble stripes enhance visibility of the roadway, particularly at night or during rainy conditions. Rumble or mumble stripes may be applied on the edgeline or centerline.

4. Profile Thermoplastic Markings – Special application of thermoplastic markings that provide a raised shape along the pavement marking edgeline or centerline. The raised shape may be applied as part of the thermoplastic marking or placed on top of the marking. Profile thermoplastic width will be consistent with the typical pavement marking widths on the roadway, generally 4 inches for non-interstate routes.

Rumble Strip Requirements

1. Fully Controlled-Access Freeways and Interstates

   Rumble strips shall be placed on all paved shoulders for all controlled-access freeways or interstates. (See standard drawings 632-105-01 and 632-105-02 for details.)

2. Other Highways & Roadways

   The Traffic Engineering Safety Office researched the crash data and identified roadway characteristics associated with higher-than-average lane departure crashes; therefore, rumble strips shall be placed on paved shoulders or edgelines of all partial and non- controlled access roadways, subject to the following criteria: (See standard drawing 632- 205-00 and 632-205-01 for details.)

   a. Roadway is classified as rural or displays rural characteristics,
   b. Non curb and gutter or valley gutter cross section,
   c. Roadway width is 20 feet or greater*,
   d. Average daily traffic (ADT) is 500 vehicles per day or greater, and
   e. Posted or design speed limit is 45 MPH or greater.

*Centerline rumbles should be provided to supplement the shoulder or edgeline rumbles when the minimum distance between the edgeline rumble strips are 22 feet or greater, allowing for a minimum 10.5 feet of clear lane width between the edgeline rumbles and centerline rumbles. (See standard drawing 632-205-00 for details.)

Sinusoidal Rumble (Mumble) Strip: Sinusoidal rumble strips may be considered when there are adjacent noise sensitive receptors (e.g. homes, schools, parks, etc.) and subject to all of the following criteria:

a. Roadway has less than 10% truck traffic,
b. Average daily traffic (ADT) is less than 2500,
c. Roadway has less than 3 lane departure style crashes (roadway departure, sideswipe, head-on) per mile over the most recent 5 year period, and
d. Recommended by the District Traffic Engineer and approved by the State Traffic Safety Engineer.

Any variations from the above criteria will require a safety analysis to determine if rumble strip application is deemed appropriate. All requests for a safety analysis shall be forwarded to the Traffic Engineering Safety Office for completion and approval by the Director of Traffic Engineering.

Rumble stripe is the preferred rumble strip application on all qualifying roadways except controlled freeway or interstate roadway types. Profile thermoplastic markings are an acceptable alternative only if rumble stripes are not feasible due to structural deficiencies of a paved shoulder where milling may damage the surface/shoulders.

The following chart provides an overview of the type and pattern of the shoulder or edge line rumble strip to be installed along different roadway types with varying paved shoulder widths.

SCDOT RUMBLE STRIP/ STRIPE REQUIREMENTS (Shoulder)				
Roadway Type	**Paved Shoulder Width**	**Rumble Type**	**Pattern**	**Standard Drawing Number**
Fully Controlled Freeways or Interstates	All	16” Milled-In Rumble Strip	Continuous	632-105-01
Other Highways & Roadways	0’-1’	4” Rumble Stripe	Continuous	632-205-00
	>1’-<5’	8” Rumble Stripe	Skip	632-205-00
	>=5’	12” Rumble Stripe*	Skip	632-205-00

Note: * A 12” sinusoidal (mumble) stripe may be considered.

Note: If unable to meet the above requirements, contact the Traffic Engineering Safety Office.

The following chart provides an overview of the type and pattern of the centerline rumble strip to be installed along different roadway types.

SCDOT RUMBLE STRIP/STRIPE REQUIREMENTS (Centerline)				
Roadway Type	**Minimum Distance Between Shoulder Rumbles**	**Rumble Type**	**Pattern**	**Standard Drawing Number**
Other Highways & Roadways	< 22’ (264”)	N.A.	-	-
	> 22’ - < 24’	12” Rumble Stripe	Continuous	632-205-00
	>= 24’	16” Rumble Stripe**	Continuous	632-205-00

Note: ** A 16” sinusoidal (mumble) stripe may be considered.

Note: If unable to meet the above requirements, contact the Traffic Engineering Safety Office.

Bicycle Considerations

Rumble strip design details and location criteria were developed after receiving input from the South Carolina cycling stakeholders, FHWA, and other state DOT's. SCDOT has implemented the following accommodations to address the presence of cyclists:

1. Reducing maximum depth of milled groove;
2. Providing an option of various width rumble strips based on the width of paved shoulder;
3. Establishing minimum ADT threshold for rumble strip application;
4. Establishing a minimum roadway width for rumble strips;
5. Where rumble strips are placed on bike lanes, a minimum width of 3' 6" will remain undisturbed on the bike lane; and
6. Inclusion of bicycle skip pattern in all applications where a 1" or greater paved shoulder width exists.

Submitted by: Brent Dillon
Director of Traffic Engineering

Recommended by: Duncan Smith
State Traffic Safety Engineer

Approved: Rob Perry
Deputy Secretary for Engineering

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