

South Carolina Department of Transportation

Engineering Directive

Directive Number: ED-53 **Effective:** April 13, 2015

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: Provide Direction for Selection and Installation of Rumble Strips

This Directive Applies to: All Employees

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 roadway departure crashes. They are used to alert drivers of lane departures by providing an audible and vibratory warning. Nationwide, road 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.
2. *Rumble StripE* – A rumble stripE is defined as a milled-in rumble strip that also contains a pavement marking stripe. After rumble strips are milled in, the pavement marking is applied on top of the rumble strip. Rumble stripEs enhance visibility of the roadway, particularly at night or during rainy conditions. Rumble stripEs may be applied on the edgeline or centerline.
3. *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 401-205-01 and 401-205-02 for details.)

2. Other Highways

The Traffic Engineering Safety Office researched the crash data and identified roadway characteristics associated with higher-than-average roadway 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 633-105-00 for details.)

- a. roadway is classified as rural or displays rural characteristics,
- b. non curb and 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.

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 rumble strip to be installed along different roadway types with varying paved shoulder widths.

SCDOT RUMBLE STRIP REQUIREMENTS				
Roadway Type	Paved Shoulder Width	Rumble Strip Type	Pattern	Standard Drawing Number
Fully Controlled Freeways or Interstates	All	16" Milled-In Rumble Strip	Continuous	401-205-01
Other Highways	0'-1'	4" Rumble StripE	Continuous	633-105-00
	>1'-<5'	8" Rumble StripE	Skip	633-105-00
	>=5'	12" Rumble StripE	Skip	633-105-00

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 community, 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 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 foot or greater paved shoulder width exists.

Submitted by: Anthony Fallaw
Director of Traffic Engineering

Recommended by: Ron K. Patton
Chief Engineer for Design and Traffic Engineering

Approved: Christy A. Hall
Deputy Secretary for Engineering

Lead: Director of Traffic Engineering

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