



# RESEARCH PROJECT CAPSULE [24-1SA]

May 2024

TECHNOLOGY TRANSFER PROGRAM

## Ground-in Edge and Centerline Rumble Strip/ Rumble Stripe Evaluation and Best Practices

### JUST THE FACTS:

**Start Date:**

May 1, 2024

**Duration:**

24 months

**End Date:**

April 30, 2026

**Funding:**

TT-Fed/TT-Reg-5

**Principal Investigator:**

Hany Hassan, Ph.D., P.E.  
Assistant Professor,  
Transportation Engineering  
Louisiana State University

**Administrative Contact:**

Tyson Rupnow, Ph.D., P.E.  
Associate Director, Research  
225-767-9124

**Technical Contact:**

Elisabeta Mitran, Ph.D.  
Assistant Professor, Research  
Louisiana Transportation Research Center  
225-767-9129

Louisiana Transportation  
Research Center  
4101 Gourrier Ave  
Baton Rouge, LA 70808

Sponsored jointly by the Louisiana  
Department of Transportation and  
Development and Louisiana State  
University

### POINTS OF INTEREST:

Problem Addressed / Objective of  
Research / Methodology Used /  
Implementation Potential

[WWW.LTRC.LSU.EDU](http://WWW.LTRC.LSU.EDU)

### PROBLEM

Rumble strips are grooved or raised patterns placed in the road surface to transmit sound and vibration to drivers. The noise and vibration produced by rumble strips alert drivers when they leave the roadway and/or inform them about condition changes that may not be anticipated by drowsy, distracted, or otherwise inattentive drivers. Rumble stripes is the term used for rumble strips painted with a retroreflective coating at the edge line or centerline pavement markings. These increase the visibility of the pavement edge at night and during inclement weather conditions. Based on their placement, there are four types of rumble strips: transverse, centerline, shoulder, and mid-lane.



Figure 1. (a & b) Centerline rumble strips (Source: McCully and Briese, 2008 and FHWA, 2018)  
(c) Shoulder rumble strips (Source: FHWA, 2018)

Despite the proven success of rumble strips/rumbles stripes in reducing roadway departure crashes, the noise produced when vehicle tires hit the strips remains a concern. In response to public concerns, researchers have worked to revise the rumble strip design, aiming to decrease external noise while maintaining or enhancing the noise and vibrations experienced within the vehicle cabin.

Despite their benefits, it remains challenging to install rumble strips and stripes that can simultaneously provide enough warning noise for drivers while not disturbing nearby residents and businesses. The implementation of rumble strips in Louisiana is not consistent across the different districts of the state. Additionally, several newer installations appear to cause vehicles to go off track when passing maneuvers are conducted. Furthermore, District 62 has two residents who regularly complain about the noise created by the rumble strips in their area. Therefore, it is critical to investigate the different designs and implementations of rumble strips used in Louisiana to both ensure roadway safety and address concerns about external noise.

### OBJECTIVES

The primary objective of this research is to evaluate the pattern, placement, and noise level of the rumble strips/rumble stripes installed on Louisiana highways to ensure that the best standards are used.

Specifically, this project aims to: (1) compare existing special rumble details in Louisiana with best practices; (2) measure the in-vehicle and external noise levels produced by various types of rumble strips in Louisiana and assess acceptable noise levels based on the 2021 DOTD Highway Traffic Noise Policy; and (3) recommend the best type/pattern of rumble strip/rumble stripe based on analysis of the collected data and research findings.

## METHODOLOGY

To achieve the objectives of this research, the research team will complete various tasks, beginning with an in-depth literature review to identify recent studies most relevant to the scope of the research. They will then document the current state of the practice by collecting available as-built drawings of rumble strips in Louisiana and surveying various rumble strips via site visits throughout the state. Next, the research team will conduct a comparison of Louisiana's rumble strips with best practices identified by the NCHRP synthesis 490 and report 641. They will then prepare an interim report to summarize the results of previous tasks.

Following this interim report, the team will select several sites for field study based on complaints and on the different types of traditional and alternative rumble strips installed on Louisiana highways. The research team will proceed with the field study, collecting in-vehicle and external noise levels at the chosen sites. The following criteria will be taken into consideration for the field study: measuring noise levels at various speeds for two passes of the test vehicle at each selected site; collecting measurements starting approximately 50 feet upstream and ending 50 feet downstream of the sound meter; measuring both ambient/baseline noise and rumble strip-generated noise for two vehicle passes for in-vehicle noise measurements, and taking noise measurements at both daytime (peak hour) and nighttime for each site. Finally, the collected data will be analyzed, and a final report will be prepared documenting the entire research effort.

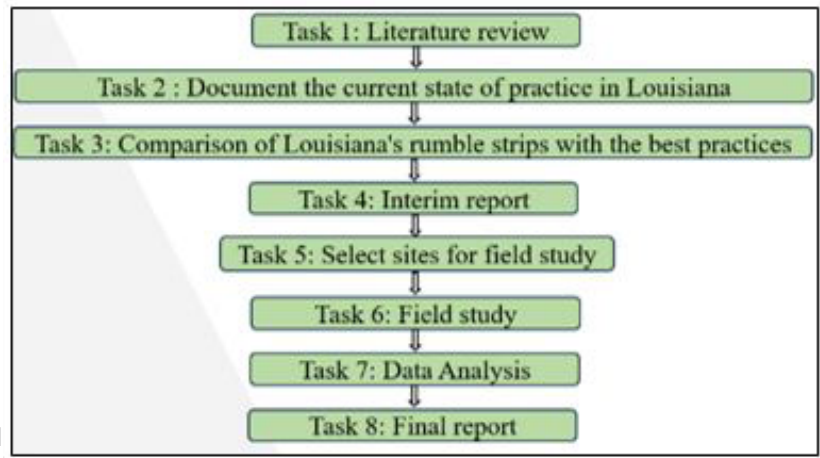


Figure 2. Overall Research Methodology

## IMPLEMENTATION POTENTIAL

The findings of this study will enable DOTD to assess the current practices used in Louisiana for installing rumble strips and guide them in selecting the best type/pattern of rumble stripes for future installation. The results will help in determining the best type/pattern of rumble strips based on the analysis of the field study, as well as recommendations for reducing noise levels at locations where acceptable levels are exceeded. Accordingly, it is expected that the findings of this research will assist transportation authorities in Louisiana in addressing complaints received from residents regarding the noise generated by rumble strips in their neighborhoods.