

STATE HIGHWAY ADMINISTRATION

RESEARCH SUMMARY

EFFECTIVENESS OF SHORT SOLID BARRIERS TO REDUCE NOISE GENERATED BY DIFFERENT TYPES OF HIGHWAY VEHICLES

WHAT WAS THE NEED?

One enduring environmental problem is noise pollution, particularly for areas near highways. Serious health problems, like sleep disruptions, cardiovascular disorders, and cognitive loss, have all been related to exposure to traffic noise. Highway noise barriers are an essential strategy for Maryland to address this issue. More research on the viability and efficacy of shorter noise barriers is required due to their cost-effectiveness, which may have the twin benefits of reducing noise pollution and enhancing road safety.

WHAT WAS THE GOAL?

The purpose of this study was to determine how well short concrete barriers work to reduce noise from passing cars. The goal was to give the State Highway Administration (SHA) information so they could determine if these barriers could be utilized to reduce traffic noise.

WHAT DID THE RESEARCH TEAM DO?

The research team used both theoretical noise models and field measurements to do a thorough investigation at several sites in Maryland. Sites were chosen according to a set of standards, such as the kind of roadway, the height of the barrier, and the lack of structures that would interfere. At-grade and elevated roadways with short concrete barriers were included in the study. Sound level meters were used to measure the sound at different distances from the nearest roadway. Traffic counts and speed were gathered concurrently. The team assessed the short barriers' ability to reduce noise using seven distinct sound propagation models. These models included custom models created for the California Department of Transportation (Caltrans) and the Traffic Noise Model (TNM) versions 2.5 and 3.2. The modeling took into consideration a few variables, including traffic

PUBLICATION MONTH, YEAR

FEBRUARY 2025

REPORT NUMBER:

MD-24-SHA/MSU/6-2

START DATE:

May 1, 2023

COMPLETION DATE:

November 30, 2024

PRINCIPAL INVESTIGATOR:

Oludare Owolabi, D.Sc. PE
Morgan State University
Oludare.Owolabi@morgan.edu

patterns, elevation, and ground type. The aim was to evaluate the noise reduction effectiveness of the short concrete barriers and compare the obtained findings with the noise modeling tools' predictions.

WHAT WAS THE OUTCOME?

The findings suggested that, under some circumstances, short noise barriers—typically measuring 2.5 to 3 feet in height—can significantly reduce noise. These barriers provided noise reductions of 3 to 5 decibels (dB) for at-grade roadways at standard residential setbacks from highways. There were noise reductions of up to 9 dB in situations involving elevated roadways. This implies that short solid barriers may be almost as effective as taller ones under some circumstances. The study also found differences between field data and common

models such as TNM 2.5 projections, underscoring the need for model enhancements, and additional measurements. TNM 2.5 occasionally underestimated the efficacy of short solid barriers, especially for elevated roads. These differences were addressed by modifications to TNM 3.2 and additional unique modeling techniques.

HOW WILL SHA USE THE RESULTS?

The SHA Office of Planning and Preliminary Engineering (OPPE) Environmental Planning Division (EPLD) will consider the research results when evaluating noise impacts and abatement options for future projects.

LEARN MORE

To view the complete report, click [here](#).

For more information on research at MDOT SHA, please visit [our website](#).
