



Caltrans Division of Research,
Innovation and System Information

Research



Results



Environmental

Tire/Pavement Noise Research Consortium; Transportation Pooled Fund TPF-5(135)

This task investigated noise reduction alternatives where traditional noise mitigation measures such as walls and berms are not viable solutions. It provided a forum for states to discuss noise issues, utilize the same techniques to build a common larger database, and share data to incorporate pavement type into the Federal Highway Administration Traffic Noise Model.

WHAT IS THE NEED?

Minimizing the impact of traffic noise on the public is a priority for state highway agencies and the FHWA. As tire-pavement noise is the single largest contributor to traffic noise on many highways, increased utilization of low-noise pavement surfaces may reduce overall traffic noise or reduce the need for expensive traditional noise mitigation measures. Developing low-noise pavement surfaces that are both durable and safe is of high interest to both state highway agencies and FHWA. Utilization of low-noise surfaces may also provide a noise reduction alternative where traditional noise mitigation measures such as walls and berms are not a viable solution. Examples of problematic areas include many bridges/structures, areas with unstable slopes, locations near water bodies/wetlands, dike/levee/floodplain sectors, where utilities near roadways cannot be moved, and in heavily urbanized areas within a built environment.

Research into these low-noise pavement treatments and materials is beginning in earnest in a variety of states. Coordinated sharing of research development, evaluation techniques, and study results is critical to reduce overall costs for key research pieces, reduce redundancy of effort, focus funding in the most needed areas, and find viable solutions that can be implemented expeditiously for the highest number of states. In short, a collaborative effort can create greater benefits than the independent efforts of individual states.

MAY 2019

Project Title:

Tire/Pavement Noise Research Consortium; Transportation Pooled Fund TPF-5(135)

Task Number: 1579

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Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

WHAT WAS OUR GOAL?

The objectives of this research are as follows:

- Provide a forum for states to discuss tire/pavement noise issues and develop a proposed research plan.
- Pool resources and efforts of multiple state agencies and industry to perform tire/pavement noise research in a similar manner (avoiding duplication) and sharing of data.

WHAT DID WE DO?

The scope of the study consisted of the following tasks:

- Provide a forum for states to discuss noise issues, utilize the same techniques to build a larger database, and share data. The ultimate goal is to incorporate pavement type into the FHWA Traffic Noise Model.
- Perform a synthesis of global practice in regards to utilizing pavement technology for decreasing tire/pavement noise;
- Perform a synthesis on the cost/benefits of using low-noise pavements;
- Produce a document for general public information regarding noise reduction;
- Provide a baseline for quieter pavement discussion (e.g. definitions, list of acronyms, etc.);
- Provide a guideline for best practices in measuring and evaluating noise benefits and decreases over the wearing life of the roadway surface.

WHAT WAS THE OUTCOME?

This project developed methods to measure and reduce noise produced by vehicles on highways.

Specific tasks that the contractor performed:

- General Consultation
- OBSI Measurements – Montana DOT

- OBSI Measurements – Ohio DOT
- OBSI Measurements – Kansas DOT
- Support for Volpe B&K Class
- Volpe Training & Comparative OBSI
- NCAT Track OBSI Measurements
- OBSI Rodeo Support & Participation
 - Comparative Testing with TxDOT, UT CTR, Transtec, and I&R
- OBSI Calibrator
- Scale for Tire Loading
- B&K Pulse Data Analysis Routine
- Quiet Pavement Folio
- NI System Development
- OBSI Database Development
- NC DOT Ambassador/Rodeo (FDOT, NCDOT, Volpe)
- WSDOT Rodeo
- New SRTT Evaluation
- OBSI Rodeo
- Outreach

WHAT IS THE BENEFIT?

The benefits of this research are as follows:

- Provide a forum for states to discuss tire/pavement noise issues and develop a proposed research plan.
- Pool resources and efforts of multiple state agencies and industry to perform tire/pavement noise research in a similar manner (avoiding duplication) and sharing of data.

LEARN MORE

<http://www.pooledfund.org/Details/Study/364>

IMAGES

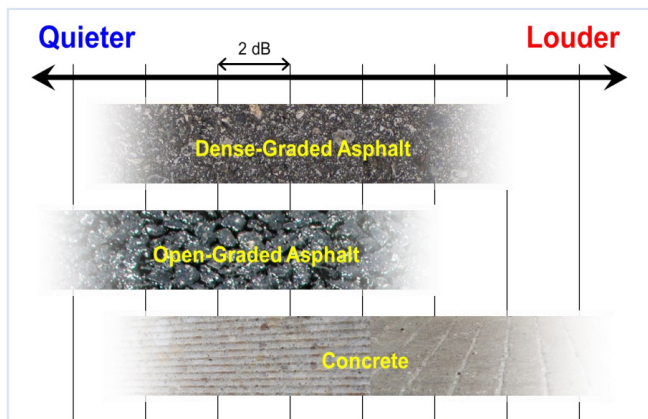


FIGURE 1: Range of tire-pavement noise levels for various types of pavement



FIGURE 2: Conceptual schematic and photos of bad and good texture profiles as they relate to tire-pavement noise generation potential



FIGURE 3 and 4: Locations of microphones for measuring tire-pavement noise (Left: measuring at the source using the OBSI method, Right: microphones for wayside measurements)

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