DRISI
Caltrans Division of Research,
Innovation and System Information

Research Results

Reducing Tire-Pavement Noise

Better practices for constructing and texturing quieter concrete pavement surfaces

Environmental

JANUARY 2016

Project Title:
PCC Surface Characteristics:
Tire-Pavement Noise Part 3, TPF-5(139)

Task Number: 1029

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Completion Date: November 3, 2014

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WHAT IS THE NEED?

TThe noise generated by tires on pavement can adversely affect those residing or working near roadways. Although portland cement concrete (PCC) pavements can produce a considerable amount of traffic-generated noise, they can be designed and constructed using standard textures to be as quiet as other conventional pavement types. One reason why all PCC pavements are not quiet is a lack of a collective understanding of the texturing characteristics that yield quieter pavements while not compromising other pavement requirements, such as safety and durability. This study identified the means for producing PCC pavements that are safe and durable but produce less traffic-related noise.

WHAT WAS OUR GOAL?

The goal was to be able to specify the appropriate surface characteristics of individual PCC pavement projects prior to construction to meet site-specific requirements for noise, skid, texture, and smoothness.

WHAT DID WE DO?

ed by the Iowa Department of Transportation (DOT), Caltrans and the other participating DOTs of this pooled fund study—Minnesota, New York, Texas, Washington, and Wisconsin—evaluated over 1,500 test sections in North America and Europe and developed an understanding of the fundamental surface properties that affect noise. This third phase of the project had the following objectives:

- Continue comprehensive data collection on new and existing pavements for measurements over time
- Analyze the data to identify the relationships between texture, noise, friction, and other characteristics

- Create and assess construction specifications of conventional texture techniques, including grinding
- Develop and evaluate innovative construction techniques that have the potential to significantly reduce noise

WHAT WAS THE OUTCOME?

The project amassed the largest database to date of PCC pavement surface characteristics, including noise, texture, and friction measurements, helping to formulate an understanding of the fundamental surface properties that affect noise. Both the best and the worst of almost every concrete pavement texture in use today has been catalogued. Pavements are categorized by texture type and overall noise levels measured using the on-board sound intensity method. The variability within distributions is due to differences in design, construction, age, climate, traffic, and other factors.

The researchers identified better practices that enhance surface properties to produce quieter PCC pavements. These practices address:

- Constructing and texturing quieter concrete pavements
- Reducing tire-pavement noise
- Solutions that do not compromise other pavement elements that are of equal or greater importance, including safety, cost, and durability

WHAT IS THE BENEFIT?

By using these better practices, quieter PCC pavements that are safe, durable, and cost effective can be built.
The practices address the challenges faced in producing a high-quality product in a low-bid environment. The collected data has shown that quieter concrete pavements do not sacrifice safety because there is no direct relationship between friction and noise. .

LEARN MORE

To view the final pooled fund study report:
www.pooledfund.org/Details/Study/368

IMAGES

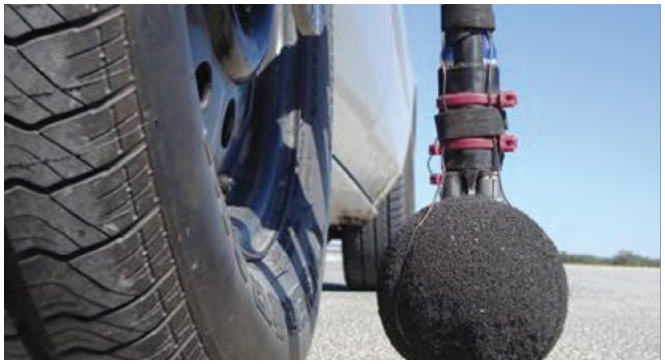

IMAGE 1: Measuring tire pavement noise

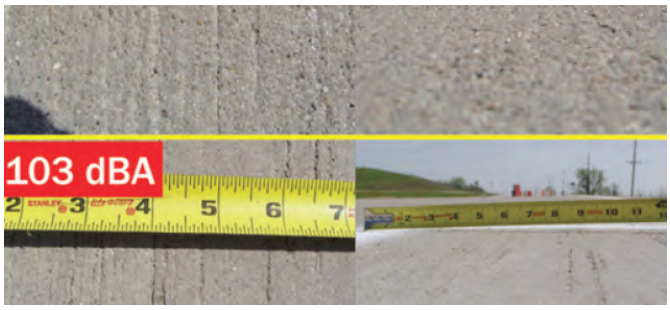

IMAGE 2: Variability of drag texture surface and its effect on overall OBSI level

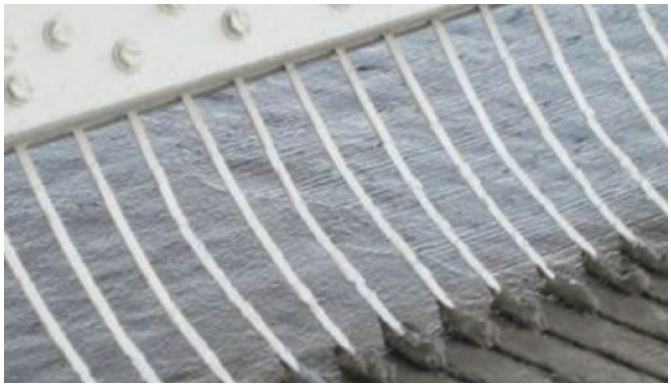

IMAGE 3: Longitudinal tining of a newly placed concrete surface