



RELATING SURFACE TEXTURE OF RIGID PAVEMENT WITH NOISE AND SKID RESISTANCE

Final Report

SQDH 2004 – 1; HL 2004 – 1

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Sponsored by: The Institute for Safe, Quiet and Durable Highways
The Ford Motor Company
The Goodyear Tire & Rubber Company
Continental General Tire, Inc.
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In Cooperation With: University Transportation Centers Program
U. S. Department of Transportation

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January 2004

1. Report No. SQDH 2004-1		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Relating Surface Texture of Rigid Pavements with Noise and Skid Resistance				5. Report Date January 2004	
				6. Performing Organization Code HL 2004-1	
7. Author(s) Jan Olek, W. Jason Weiss, and Rolando Garcia-Villarreal				8. Performing Organization Report No.	
9. Performing Organization Name and Address The School of Civil Engineering Purdue University 550 Stadium Mall Drive West Lafayette, IN 47907-2051				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address The Institute for Safe, Quiet and Durable Highways Purdue University 140 S. Intramural Drive West Lafayette, IN 47907 – 2031				13. Type of Report and Period Covered Final Report	
				14. Sponsoring Agency Code	
15. Supplementary Notes: Research completed with sponsorship from: The Ford Motor Company; The Goodyear Tire & Rubber Company; Continental General Tire, Inc.; Hankook Tire Company; Michelin Americas Research & Development Company					
16. Abstract <p>Although pavements are initially designed to be durable for specified traffic loads, they must also satisfy other functional characteristics, primarily safety, smoothness and comfort (noise generation). Frequently, there are necessary trade-offs for the surface texture of pavements to "improve" certain of these pavement functional characteristics. This study assessed the influence of the depth, width, and shape of transverse tining of PCC Pavements on generation of tire/pavement interaction noise. The study also considered various other common PCC pavement surface textures – Astroturf, trowel, and broom finishes - and their influence on noise generation. And lastly the study assessed the influence of pavement texture profile on noise and skid resistance (safety).</p> <p>A mathematical model was developed to determine the stress distribution between the concrete pavement and the tire. The stress distribution was transformed to a power density spectrum to represent the input to the noise generation as the tire rolls over the surface. Noise modeling based on the stress distribution was performed for a set of surfaces and tine geometrics. Full scale testing of a tire on a concrete surface through the use of the SQDH Tire/Pavement Test Apparatus (TPTA) was performed to obtain the noise generated over various concrete surfaces. A laser profilometer was used to obtain the X, Y profile of different textured surfaces. This profile was used as an input for the stress model and used to obtain a transfer function for the noise model. An empirical transfer function was generated to link the computer modeling of the stress with the noise measured from the TPTA testing. Friction testing was performed on the different surfaces and was related to texture depth obtained from the laser profilometer.</p> <p>From the model and testing on the TPTA, the shape of the tine edge did not significantly change the overall noise level or the shape of the spectrum generation. However, the influence of the width of the tine was significant – reducing tine width resulted in a reduction of the overall sound level. Further study is needed to develop pavement surface textures that can provide desirable levels of safety and reduction in noise levels.</p>					
17. Key Word Noise, Traffic noise, Pavements, Noise control, Concrete pavements, Pavement designs, Rigid pavements, Pavement performance, Safety			18. Distribution Statement No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price