

SURFACE CHARACTERISTICS OF REHABILITATED CONCRETE PAVEMENTS

Background

Diamond grinding is a process to correct defective surface textures and poor ride quality in concrete pavements. In addition to being used as a rehabilitation tool, some agencies use diamond grinding as the initial pavement surface texture. It can also have a positive effect on reducing tire-pavement noise. The growing awareness of noise as an important pavement surface parameter resulted in an increase in the amount of research focused on the study of roadway pavement surfaces, the noise they produce, and in the development of quieter pavement surfaces. The American Concrete Pavement Association (ACPA), The International Grinding and Grooving Association (IGGA) and Purdue University worked with the Federal Highway Administration (FHWA) to develop quieter diamond-ground pavement surfaces. The aim of this research project is to validate those pavement surfaces tested indoors at the Purdue University's Tire Pavement Test Apparatus (TPTA) research laboratory by studying their performance in roadway sections at MnROAD.

Project Goals and Objectives

The overall goal of this pooled fund project is to provide data for optimization of pavement quietness, friction, ride, and texture for rehabilitated concrete pavements. This will enable agencies to improve diamond grinding and texture specifications. It will provide more information on tire pavement interaction for design of quiet pavements generated by tire-pavement interaction.

Performance parameters with respect to time and traffic various grinding techniques will be studied. Mathematical models that can be used to predict tire-pavement noise from different types of rehabilitated Concrete pavements will be developed. MnROAD staff will also work with FHWA to write a Technical Report (or TechBrief) document that summarizes all of the construction, monitoring, data analysis efforts, and other results obtained from the project.

The Experimental Plan

This project will diamond grind selected concrete pavement test cells on the MnROAD pavement test facility using the latest techniques developed at Purdue University Center for safe Quiet and Durable Highways (SQDH) by the American Concrete paving Association (ACPA) , International Grooving and Grinding Association (IGGA) and Federal Highway administration (FHWA) . The performance of the ground cells at MnROAD will be compared to standard diamond grinding and other concrete surfaces. The Mn/DOT research team will measure surface characteristics including noise, friction, ride, and durability seasonally throughout the 5-year life of the project. Laser-equipped devices will monitor texture and ride quality. MnROAD staff will measure tire-pavement noise with on-board sound intensity (OBSI) tools, and will also measure friction with dynamic friction tester.



Project Status

The pooled fund study team is comprised of the Texas DOT, Minnesota DOT, FHWA and IGGA. Initial validation of the laboratory work began with the summer 2007 initiative that performed strips of the Conventional Grind, Innovative Grind in one pass and Innovative Grind in one and two passes. This grinding was performed by Diamond Surfaces Inc, a member of IGGA on the MnROAD Low Volume Road. This was followed by the full width grinding of the innovative and conventional grind on the MnROAD mainline Cells 7 and 8 in October 2007. Continued research and monitoring led to the development of an improved innovative grind or Ultimate Grind that was performed full width on the MnROAD Mainline cell 9 in October 2008. The construction process for cells 37, 7 and 8 are elucidated in a draft report <http://www.dot.state.mn.us/materials/researchdocs/ReportDiamondGrinding.pdf>. All the test sections are being monitored seasonally.



For more information:

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