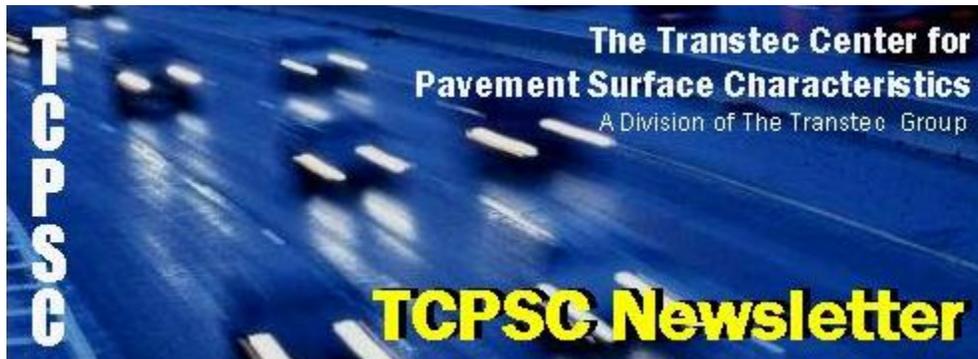


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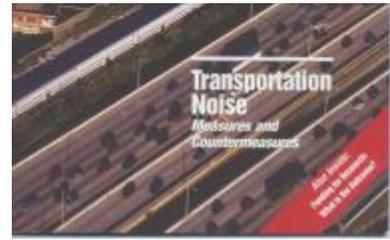
TR News Focuses on Tire-Pavement Noise Issues

Washington, D.C. - Transportation noise is such a prominent issue that it has earned the cover story of a recent issue of TR News. Among many topics, the story tackled tire-pavement noise, citing what our industry is doing to reduce it. This noise, which results from tire-pavement interaction, has been recognized since the early 1970s when cities and other residential areas began to experience expansion of the Interstate system. The interaction between tires and pavement creates different types of noise characteristics. Noise occurs as a result of air in the tire tread being pumped in and out. Vibration of the small rubber blocks on the tire also lead to noise,



as does a "slip-stick" mechanism that leads to a high-frequency "squeal", most noticeable during braking and cornering.

Many different pavement surfaces are used throughout the world to reduce tire-pavement noise, and the solutions continue to evolve. In some places, the use of open-graded mixtures helps to decrease noise, while in others, diamond grinding has shown promising results. TCPSC works toward advancements in tire-pavement noise solutions, while taking into account other considerations such as cost, smoothness, safety, and durability.



TR News is the Transportation Research Board's bimonthly magazine that features timely articles on innovative and state-of-the-art research and practice in all modes of transportation. For more information, please visit [TRB](#).

Purdue SQDH to Hold Second Noise Workshop



Indianapolis, IN - Purdue will be holding the second installment of the Tire/Pavement Noise Strategic Planning Workshop series from April 10-12, 2006 in Indianapolis. In September 2004, members of the highway, automobile, tire, and noise industries joined together to create the Roadmap for Quieter Highways at a seminar coordinated by Dr. Robert Bernhard and hosted by the Institute for Safe, Quiet, and Durable Highways (SQDH) at Purdue University. The roadmap identified several areas in need of improvement such as noise measurement, materials characterizations, quiet pavement design, construction, and maintenance practices. Attendees at the workshop will be able to learn about developments and

updates regarding the Roadmap for Quieter Highways. Leaders from numerous public agencies, industry, and academia will attend to represent all related fields including materials, pavements, environment, and vehicle dynamics.

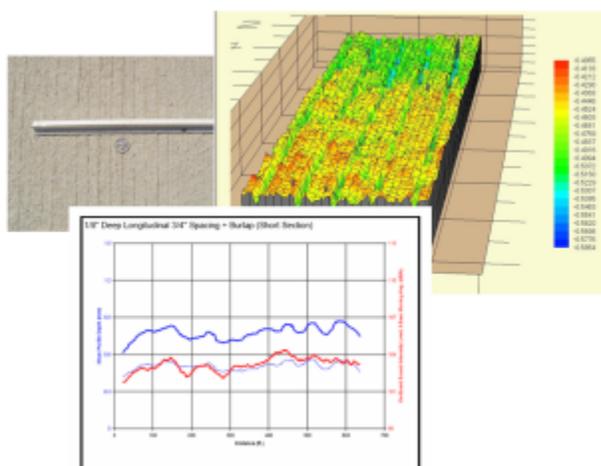
The FHWA continues to take a leadership position in tire-pavement noise. Last year the FHWA issued a memorandum to provide guidance to State DOTs that wish to enter a Quiet Pavement Pilot Program (QPPP), or conduct Quiet Pavement Research (QPR). The guidance states, to conduct quiet pavement research, a State DOT should develop a Quiet Pavement Research Plan that: (1) outlines its intended purpose; (2) details all data acquisition; and (3) contains periodic reporting requirements. The Research Plan should be reviewed and approved by the respective FHWA division office, with the concurrence of HEPN. An attached Sample Data Acquisition Plan should be used as guidance for data acquisition. Noise data must be gathered to document the noise levels in residents' backyards (wayside acoustical data). The research should include, for each applicable pavement type, a minimum of four studies that substantiate the policy change being considered. To account for variations in pavement design, construction, maintenance, and materials, these studies should: (1) be in different locations within the State; (2) collect noise characteristics and safety and durability data for at least 5-10 years (or longer, based on the pavement life); and (3) involve different construction contractors. More information is available at [FHWA QPPP](#).

CPSCP Investigates Quieter Pavements across North America

Ames, IA - The Concrete Pavement Surface Characteristics Program (CPSCP) is a combined effort of the Federal Highway Administration, American Concrete Pavement Association, and the National Concrete Pavement Technology Center located at Iowa State University. The Program is well underway, and some important findings have already been identified. Paul Wiegand, a Research Engineer at the National Concrete

Pavement Technology Center, explained that work has so far included, "simultaneous measures of noise, profile, friction, and texture from active roadways across the U.S. and Canada." He continues, "the intent is to first link tire-pavement noise to texture and friction, then to attempt to measure the rate of change of these properties over time."

Solving the problems surrounding tire-pavement noise will not be a simple task, according to Ted Ferragut of TDC Partners, Ltd. who leads the field investigation on behalf of the CP Tech Center. "The overall surface characteristics issue is extremely complex since noise, smoothness, friction, and other functional properties are all interrelated." Ferragut says that, "traffic volume and mix, roadway geometrics and the type of facility adjacent to the highway also play important roles. As a result, the concrete pavement industry must work with governments to come up with a comprehensive solution."



The CPSCP project focuses on investigating quieter pavements that do not compromise other pavement characteristics such as friction. The project is examining over 150 different pavement textures around the US and Canada using various measurement techniques for friction, texture, smoothness, and noise. These techniques include the adoption of an innovative Selcom RoLine line sensor from LMI Technologies mounted on a robot termed RoboTex (Robotic Texture Measurement). Using RoboTex, pavement texture is measured in 3-D with a resolution of less than 0.5mm laterally and 0.01mm vertically. This allows the team to relate noise to texture at the precise location that it originates. "This type of data collection is believed to be some of the first in the world," said Ferragut. "Preliminary analyses of variability show wide

overlap between texture types, with even some transverse lined sections among the very quietest out there. It also appears that even a slight variation in depth can have an appreciable influence on noise at the tire-pavement interface. Without the RoboTex device, measurements of this type would simply not be possible."

The data is currently being mined for initial findings that can be released to the pavement community, allowing practitioners to make necessary changes in texturing practices. The project is expected to continue for at least five more years, with monitoring on an annual basis. Data collected from the CPSCP provides indispensable insight into concrete pavement texturing and acoustics, and is expected to generate academic studies for many years. For more information regarding the Concrete Pavement Surface Characteristics Program, please contact Ted Ferragut at tferragut@tdcpartners.com.

NCAT Begins Quiet Asphalt Pavement Studies

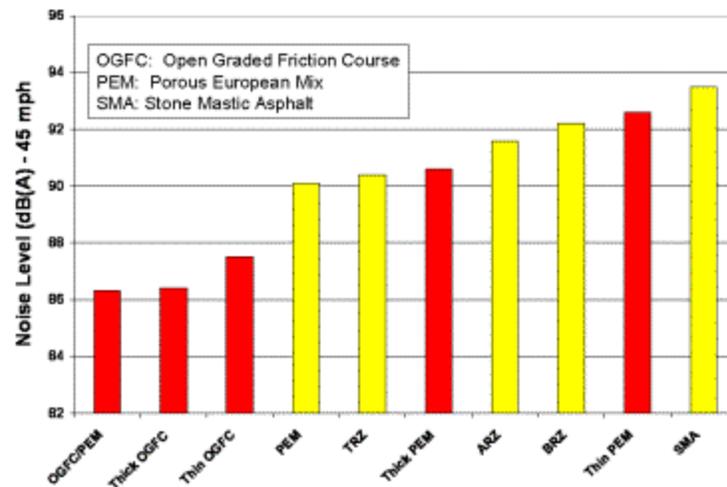
Auburn, AL - André de Fortier Smit has taken the lead on several noise projects at the National Center for Asphalt Technology (NCAT). This includes two FHWA quiet asphalt pavement studies that were initiated by Doug Hanson who retired in 2005. The NCAT studies involve the improvement and assessment of equipment that measures tire-pavement noise, as well as the evaluation of pavement test sections. The first project centers on equipment used for Close-Proximity (CPX) testing and the Ultra-Light Inertial Profiler (ULIP-T). CPX



testing involves measuring noise close to the tire-pavement contact zone. According to Smit, the project consists of three main tasks: (1) evaluation of Sound-Intensity for CPX testing; (2) evaluation of the effect of pavement temperature on CPX test results; and (3) evaluation of texture measurement equipment. Testing will be conducted at the NCAT test track and on several field sections in the Auburn-Opelika vicinity. The

study will examine several variables including vehicle, tire, and pavement type, as well as vehicle weight. The temperature study, which should take place during the spring and summer, will investigate the claim that every 10°C increase in temperature causes a noise level increase of 1 dB.

The ULIP-T is also being evaluated for its ability to conduct surface texture measurements. Jim Mekemson, representing FHWA, is working with NCAT to update ULIP-T software so that raw surface profile data will also be reported and used for texture wavelength determinations.

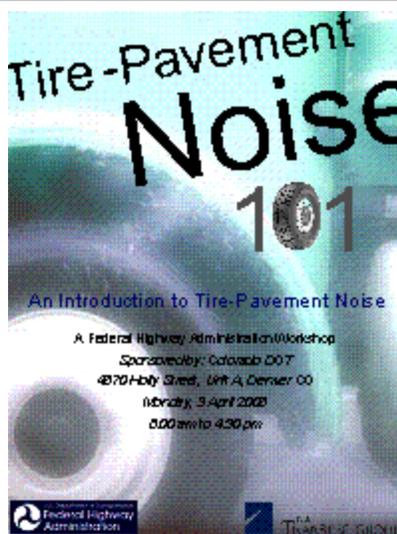


Smit is also taking the lead on a project involving low-noise pavement test sections and the evaluation of different asphalt mixtures including single- and double-layer porous asphalt pavements. According to Smit, "ten different test sections are to be constructed on the inside passing lane of both the north and south tangents of the NCAT test track."

The ULIP-T, CTMeter, ASTM E 274 Skid Trailer, and a GripTester will all be utilized in addition to testing sound absorption. Preliminary results of the north tangent sections were discussed at the NCAT Test Track Conference last November. Some of the results presented suggested that the fine-graded OGFC and the two-layer OGFC were the most successful mixes for reducing noise. "Thick OGFC layers also appear to disperse the noise better than thin lift construction," said Smit. The completion date for the low-noise pavement project is set for September 2006. You can contact André de Fortier Smit with any questions regarding the testing at smitade@auburn.edu.

Tire-Pavement Noise 101 Workshops Underway

Austin, TX - On May 4, 2006 the Federal Highway Administration (FHWA) and the Transtec Group will conduct the next workshop in the Tire-Pavement Noise 101 series in Gainesville, Florida. This event, hosted by the



Florida Department of Transportation, will continue to educate both pavement and noise practitioners about tire-pavement noise, and allow them to better understand this important topic and how it may eventually impact their day-to-day operations. The workshop aims to provide an understanding of the fundamentals of measuring and interpreting noise. Other objectives include an examination of current practices for designing and constructing quieter pavements, as well as research and policy directives related to tire-pavement noise. Principal instructors at the workshop include Dr. Robert Otto Rasmussen of The Transtec Group and Dr. Robert J. Bernhard of Purdue University.

Workshops Completed	Future Workshops Scheduled
Baltimore, MD Frankfort, KY Des Moines, IA Austin, TX Orlando, FL Minneapolis, MN Seattle, WA Sacramento, CA St Louis, MO Denver, CO	Gainesville, FL Trenton, NJ Richmond, VA Olathe, KS Honolulu, HI

To schedule a free workshop in your state, please contact Mark Swanlund of the Federal Highway Administration

at mark.swanlund@fhwa.dot.gov.

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