



TRANSPORTATION POOLED FUND
PROGRAM

TECHNICAL SUMMARY

Mn/DOT Technical Liaison:

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TOTAL STATE CONTRIBUTIONS

TO DATE:

\$1,822,326

Mn/DOT CONTRIBUTIONS

TO DATE:

\$21,500

PARTICIPATING STATES:

AL, AZ, CO, FL, GA, KY, LA, MI, MN, MS,
NV, NJ, NC, RI, SC, TN, TX, VT, VA, WI



Mn/DOT is using the NCAT-developed close-proximity trailer to study tire-pavement noise.

The trailer takes direct measurements of sound pressure using microphones near the road surface.



RESEARCH SERVICES

OFFICE OF POLICY ANALYSIS,
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Pooling Our Research: Southeastern Superpave Center

Why a Pooled Fund Study?

In 1992, the [Strategic Highway Research Program](#) introduced the Superpave system, a method for designing asphalt mixtures that produce more durable pavements. To help states implement this system, in 1995 the Federal Highway Administration established five Superpave Regional Centers. These centers involve a partnership between state highway agencies, academia and regional asphalt user-producer groups to conduct training in the use of Superpave testing procedures and equipment as well as to conduct research to refine the Superpave system and facilitate its implementation.

One of these centers, the Southeastern Superpave Center, is housed at the National Center for Asphalt Technology at Auburn University in Auburn, Ala. NCAT's state-of-the-art asphalt research facility includes a 1.7-mile test track for accelerated evaluation of pavement sections built from various mixtures. Heavy trucks running on the track around the clock inflict the equivalent of 20 years of normal pavement wear in two years. To benefit from NCAT research, in 2000 Mn/DOT joined SSC pooled fund project TPF-5(037), which continued pooled fund study SPR-3(040).

What is the Pooled Fund Study's Goal?

The goals of the Southeastern Superpave Center pooled fund study are to:

- Assist state agencies with training for implementing Superpave asphalt binder and mixture design specifications and procedures.
- Verify and troubleshoot Superpave binders and mixtures, and perform forensic analysis on roadways with premature failures.
- Conduct other Superpave-related research, including group-sponsored research for the SSC and research on behalf of individual member agencies.

Minnesota joined this pooled fund to ask NCAT researchers to use a new technology—the close-proximity trailer, developed by NCAT in 2002—to compare the loudness of various Minnesota pavement surface textures as they come in contact with vehicle tires.

What Have We Learned?

In 2005, NCAT researchers completed the project on behalf of Mn/DOT and presented their findings in "[Evaluation of the Noise Characteristics of Minnesota Pavements](#)." This project measured tire-pavement noise levels using a close-proximity trailer with microphones placed near the interface of the trailer tires and pavement surface. Researchers tested 32 hot mix asphalt and portland cement concrete pavement sections on Mn/DOT highways and nine sections at [MnROAD](#). Concrete surfaces included a number of the different textures that are added during construction by dragging various materials across the wet concrete to create friction and skid resistance. Researchers found that Mn/DOT's current specification for the turf and broom drag surfaces provided the lowest noise levels for concrete, followed by the diamond grind. Asphalt surfaces were uniformly quieter than concrete surfaces, while transversely tined concrete surfaces were considerably noisier than all others tested.

TPF-5(037) Southeastern Superpave Center. The Southeastern Superpave Center helps states implement the Superpave system for more durable asphalt pavements. Mn/DOT asked center researchers to compare the tire-pavement loudness of several Minnesota pavement surface textures using the center's close-proximity trailer.

“This pooled fund study provided Mn/DOT with important information concerning tire-pavement noise levels for various pavement surface texture types.”

—**Deb Fick**,
Research SP&R
Administrator, Mn/DOT
Research Services

“Using the right pavement surface texture can result in a significant reduction of tire-pavement noise, reducing the need for noise barriers to shield populated areas and leading to millions of dollars in cost savings.”

—**Jerry Geib**,
Pavement Design
Engineer, Mn/DOT Office
of Materials

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The Southeastern Superpave Center is housed at the National Center for Asphalt Technology in Auburn, Ala. Much of its research involves the 1.7-mile-long NCAT Pavement Test Track, the largest asphalt research testing facility in the Western Hemisphere.

Mn/DOT also benefited from the SSC’s various projects to analyze asphalt materials and mixtures, develop new testing equipment and evaluate pavement performance. Results include:

- A finding that the use of AASHTO flexible pavement layer coefficients results in pavements that are 18 percent thicker than necessary, with a recommendation that coefficients be increased for pavements with thicknesses greater than 5 inches.
- An evaluation of fine aggregate angularity testing that may lead to changes in agency specifications.
- A new field permeameter for evaluating the quality and porosity of asphalt pavements.
- Tests that will help refine the mixture designs of open graded friction courses.
- The certification of more than 200 technicians and engineers in Superpave mix design and asphalt binder testing.

What’s Going On Now?

While pooled fund study TPF-5(037) is now complete, in April 2010 pooled fund study TPF-5(228) was initiated to continue SSC support, with several research projects beginning in the near future. The SSC continues to offer training courses to state and international participants, providing them with the skills needed to perform Superpave binder and mix design testing.

What’s Next?

Under TPF-5(228), the SSC will be conducting projects that include friction testing of several asphalt mixes, noise testing and training courses for stone matrix asphalt mix design. More details concerning these projects will be available in the next [quarterly report](#) for TPF-5(228). Researchers recommend new projects to:

- Conduct further noise evaluations of various pavement surface textures under changing traffic conditions.
- Optimize warm mix asphalt designs and evaluate their field performance.
- Evaluate new asphalt industry equipment as it becomes available, conduct specialized training for the inspection of asphalt construction operations and conduct research to validate mechanistic-empirical design.

This Technical Summary pertains to the ongoing Pooled Fund TPF-5(037), Southeastern Superpave Center, continuing the project initiated under SPR-3(040). Details of this effort can be found at <http://pooledfund.org/projectdetails.asp?id=30&status=24>, <http://pooledfund.org/projectdetails.asp?id=191&status=24> and <http://www.eng.auburn.edu/research/centers/ncat/southeastern.html>. The report for the SSC study commissioned by Mn/DOT, “Evaluation of the Noise Characteristics of Minnesota Pavements,” can be accessed at <http://www.dot.state.mn.us/materials/pvmtdesign/noise.html>.

For more than 25 years, FHWA’s Transportation Pooled Fund Program has been providing state DOTs and other organizations the opportunity to collaborate in solving transportation-related problems. The TPF Program is focused on leveraging limited funds, avoiding duplication of effort, undertaking large-scale projects and achieving broader dissemination of results on issues of regional and national interest.