

NATIONAL SUPERPAVE RESEARCH CONTINUES TO FILL IN THE GAPS

The number of national research projects addressing Superpave issues continues to increase. Although the five-year research program that led to Superpave was quite extensive, there simply was not enough time or resources to answer all of the questions related to the implementation of a new system.

The National Cooperative Highway Research Program (NCHRP) is one of the main organizations sponsoring Superpave research. (FHWA is another.) NCHRP is a branch of the National Academy of Sciences (NAS) and is funded by contributions from all of the state departments of transportation. This sponsorship tends to lead to practically oriented, implementable research projects meeting recognized needs for information. Several Superpave-related projects are ongoing at NCHRP or are scheduled to start soon. Here is a very brief run down of the current projects.

NCHRP 9-7 *Field Procedures and Equipment to Implement SHRP Asphalt Specifications.* This study was recently completed by Brent Rauhut Engineering and some of the results were published as NCHRP Report 409, "Quality Control and Acceptance of Superpave-Designed Hot Mix Asphalt." This study was designed to establish comprehensive QC/QA procedures for the plant and laydown site. The Field Shear Tester (FST) was developed under this study to be used in conjunction with quality testing. The Superpave Gyratory is also an integral tool for QC/QA testing. The study also developed the framework for a training program to qualify technicians to do the QC/QA.

NCHRP 9-9 *Refinement of the Superpave Gyratory Compaction Procedure.* The objectives of this study are to recommend appropriate changes to the Superpave gyratory compaction procedure to further refine the procedure and to extend the use of the procedure (or modified procedures) to open-graded, gap-graded and large stone mixtures. The study is currently evaluating such things as the effect of short-term aging temperature on mix compaction, effect of mixture depth in the pavement on the required N_{design} requirement, simplification of the N_{design} table, need for N_{max} and extension of the N_{design} table to low-volume and very high volume roadways. Auburn University (NCAT) is expected to complete this research soon.

NCHRP 9-10 *Superpave Protocols for Modified Asphalt Binders.* This study, being conducted by the Asphalt Institute and Dr. Hussein Bahia at the University of Wisconsin, is intended to provide detailed guidance on how to revise the Superpave binder tests and specifications to make them applicable to modified binders. The study will also identify problems with the Superpave mixture analysis tests when testing modified binders. The generalized approach being proposed under this study involves use of screening tests to categorize a binder as simple or complex; different testing procedures are then followed for the different binder types. Phase III of this project is currently underway with a planned completion date of September 1999.

NCHRP 9-12 *Incorporation of Reclaimed Asphalt Pavement in the Superpave System.* The objective of this study is to develop detailed guidelines for incorporating RAP in Superpave mixtures, including manuals for field and mix design laboratory technicians. The study is first investigating whether RAP is just a "black rock" or whether there is in fact some blending of the old, hardened RAP binder in the added virgin binder. Following this investigation, the study will

go on to evaluate the effects of RAP on resulting binder and mixture properties and develop working guidelines for the use of RAP. The North Central Superpave Center and the Asphalt Institute are collaborating on the project which will be completed in 1999.

NCHRP 9-13 *Evaluation of Water Sensitivity Tests.* The test method used in Superpave to assess the resistance of an asphalt mixture to stripping (moisture sensitivity), AASHTO T283, was developed for 4-inch Marshall or Hveem samples. This study is intended to evaluate the applicability of the test and current criteria to 150mm gyratory samples. The University of Nevada at Reno is conducting the study, which is scheduled to conclude December 31, 1998.

NCHRP 9-14 *Investigation of the Restricted Zone in the Superpave Aggregate Gradation Specification.* This study will determine if the restricted zone requirement is necessary by evaluating the performance of hot mix asphalt; fine aggregate angularity and the volumetric mix criteria may be adequate to assure performance, at least at some traffic levels. This two-year study was initiated at NCAT May 1, 1998.

NCHRP 9-15 *Quality Characteristics and Test Methods for Use in Performance-Related Specifications of Hot Mix Asphalt Pavements.* A contract will soon be awarded for this three-year research project to identify construction-related and as-produced quality characteristics of HMA pavement that affect long-term performance, and select simple, practical, rapid tests to measure these quality characteristics in the field suitable for use in performance related specifications. It is envisioned that existing test methods can be used to measure quality and new methods need not be developed. The study will also develop an experimental plan for field validation of the proposed test methods, criteria and threshold values.

Three additional projects are planned and are under development at the current time.

NCHRP 9-16 *Superpave Mix Design Mechanical Property Test.* Many agencies see a need for a mechanical strength test to be used at the conclusion of a volumetric mix design to provide some confirmation that the mix designed will have adequate resistance to permanent deformation. Several efforts are already underway to develop such a test, such as work sponsored by the FHWA and the Field Shear Test developed under NCHRP 9-7. This study is intended to determine if characteristics of the Superpave gyratory compaction curve can be related to permanent deformation in pavements. The study is tentatively scheduled and a request for proposals is expected soon.

NCHRP 9-17 *Accelerated Laboratory Rutting Tests: Asphalt Pavement Analyzer.* Many states, especially in the southeast, are working with the Asphalt Pavement Analyzer (APA), formerly called the Georgia Loaded Wheel Tester, to evaluate the rutting-resistance of asphalt paving mixtures. The objectives of this project will be to determine the suitability of the APA for predicting rutting and for use as a field QC/QA test, and to compare the effectiveness of the APA to other loaded wheel testers and a simple strength test. The request for proposals on this project was posted in mid-August.

NCHRP 9-18 *QC/QA Procedures for Superpave Mixes.* This study will follow-up on the results from NCHRP 9-7 and further evaluate the Field Shear Test (FST) device. Specifically, the study will evaluate how specific mix types and volumetric properties affect FST-measured shear properties, modify the prototype FST, if required, and develop a draft test method and guidelines in

standard AASHTO format. More detailed information on all of these projects can be found at the NAS website (<http://www2.nas.edu/trbcrp/nchrp5/>).

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FPI Newsletter, Vol. 7 No. 4, December 15, 1998