Manuual of Practice for Conducting Superpave Asphalt Binder Tests

By Dr. David A. Anderson, NECEPT Director

As part of the NECEPT pooled fund agreement with the northeast states a series of binder technician workshops were held in January of 1998 and 1999. These workshops were held at Penn State and at the CAP Lab at the University of Connecticut. Technicians from each of the twelve states and from suppliers within the region attended the workshops. The workshops were designed to identify binder testing practice in the region. On the basis of these workshops it became very obvious that, in many cases, there was considerable variability in the manner in which some of the testing was being performed in the different laboratories. This variability was attributed, not only to a lack of training and familiarity with the test methods, but also to ambiguities or omissions in the test methods. As a consequence NECEPT has developed an extensive Manual of Testing Practice that supplements the AASHTO test methods. The purpose of this manual is to clarify the existing AASHTO test methods and to provide supplemental information where there are ambiguities and omissions in the test methods. The manual should be valuable as a laboratory reference and will become a required reference for the binder technician certification program that is now being proposed in the northeast.

The manual presents a basic overview of asphalt binder properties as they relate to sampling and testing and an introduction to the Superpave specification. Basic elements of temperature control are presented followed by chapters devoted to each of the binder test methods used in the Superpave specification for asphalt binders. The final chapter demonstrates the grading of an asphalt binder with a discussion of test repeatability and reproducibility.

Some of the highlights of the manual include a discussion of the nature of asphalt binders and its importance to sampling and handling. The properties measured in the laboratory depend on proper handling and conditioning of test specimens. Although asphalt binders must be thoroughly heated prior to testing to destroy any reversible molecular structuring that occurs during storage, they must not be overheated or their properties will be irreversibly changed. Structuring can occur when asphalt binders are stored at room temperature, as for example in the silicone rubber molds that are used in many laboratories to prepare DSR test specimens. At low temperature physical hardening can occur. Physical hardening is caused by time dependent volume change in the binder that causes the stiffness of the binder to increase.
The twelve-state Northeast Regional Pooled Fund Contract that provides support to NECEPT was officially signed by PennDOT and Penn State on December 11, 1998. Two regional task forces have been empanelled to assist NECEPT – a task force on binder technician certification and a second on quality control/quality assurance (QC/QA) issues. The binder technician task force met on February 23 and June 8, 1999. The QC/QA task force met on May 27, 1999. A great deal of input has been received from the two task forces and they are proving very valuable in guiding the respective tasks. In January 1999, two Advanced Binder Technician Workshops were conducted, one at Penn State and one at CAP Lab at the University of Connecticut. These were followed in March by two pilot binder technician certification programs, one held at Penn State and the other at CAP Lab.

Four reports have been released by NECEPT under this contract; three deal with round robins conducted in the Northeast and the fourth documents a statistically based acceptance plan for PG binders. A Manual of Practice for conducting the Superpave binder tests has undergone several drafts and a final revision is now underway with an early August expected release date. An article about the Manual of Practice is included in this newsletter. A binder technician certification program has been developed jointly by the CAP Lab and NECEPT. Tentative plans for implementing the certification program assign responsibility for the technical content of the program to NECEPT and administrative responsibility for the program to the New England Transportation Technician Certification Program (NETTCP).

The items presented above give an overview of the contents of the Manual of Practice. The manual is currently being edited and upgraded. It should be available for purchase in CD-ROM format from NECEPT by early August 1999. Please address any questions regarding the manual to Ms. Anne Stonex, NECEPT Operations Manager, by telephone at (814) 863-5789 or by e-mail at superpave@psu.edu.
Northeast Asphalt User/Producer Group (NEAU/PG) and Pennsylvania DOT Implementation of Superpave in Pennsylvania

Anne Stonex, Operations Manager, NECEPT

On April 30, 1999, NEAU/PG and the PennDOT Bureau of Construction and Materials teamed to conduct a one-day Superpave Update workshop at the Penn State Conference Center in State College, PA. The target audience included pavement and project designers, materials personnel and construction personnel. A total of 67 people attended, including three from the PA Turnpike Authority and one representative each from FHWA and NECEPT along with PennDOT personnel. Organizers included Mr. Frank Fee, Producer Chairman NEAU/PG and Mr. Timothy Ramirez, PennDOT MTD Bituminous Engineer-Design. The entire group attended the morning presentations.

After welcoming announcements by Mr. Fee, Mr. Gary Hoffman, PennDOT Chief Engineer, started by describing PennDOT’s new Superpave implementation plan. PennDOT is now preparing for full Superpave implementation in the year 2000. A new section, Chapter 2A, “Design and Control of Hot-Mix Asphalt (HMA) Mixtures Using the Superpave Asphalt Mixture Design and Analysis System” will be added to PennDOT Bulletin 27, “Bituminous Concrete Mixtures, Design Procedures and Specifications for Special Bituminous Mixtures.” Standard Special Provisions have been prepared to govern production and control of Superpave base, binder and wearing course mixtures for PennDOT projects. These will be incorporated in PennDOT Standard Specifications, Publication 408. These new documents incorporate the most recent changes to Superpave mixture design parameters and procedures adopted by AASHTO in 1999. Copies of each document were included with other workshop handouts in notebooks that were provided to all of the attendees.

Jean Sexton presented an update on FHWA activities related to Superpave. She also spoke about ongoing national Superpave activities that are covered in much greater detail elsewhere in this newsletter. Ms. Sexton discussed work under the Models Contract that is now focusing on developing a simple mixture strength test to supplement the existing Superpave mix design method that is based solely on volumetric mixture properties. Ms. Sexton also informed the group of current work in progress to develop a new AASHTO pavement design guide, the “2002 Guide for the Design of New and Rehabilitated Pavement Structures.”

Mr. Fee informed the group of current NEAU/PG activities, and Anne Stonex gave a brief update on Superpave and technician certification activities at NECEPT.

Mr. Ramirez introduced and discussed PennDOT’s new Superpave Pavement Policy, which has been submitted for inclusion in PennDOT Pub. 242, “Pavement Policy Manual.” This guide document presents Department policies and procedures for selecting and specifying PG binder grades, design ESALs, and mixture designation with respect to plan compacted thickness.

After lunch, the participants split into three groups that rotated through each of the three one-hour breakout sessions. The afternoon breakout sessions and facilitators were:

- Mix Design - Mr. Dean Maurer, PennDOT Bituminous Engineer - Materials
- Construction - Mr. Ron Corun, Citgo Asphalt with a brief section by Mr. Carlos Rosenberger, Asphalt Institute
- Pavement/Project Design - Mr. Ramirez, Mr. Dan Dawood, PennDOT Design and Mr. Fee

The mix design session covered details of the changes to PennDOT specifications and procedures for binder and mixtures, primarily items included in the additions to Bulletin 27 and the Superpave Special Provisions.

The construction session offered a number of topics: forensic analysis of various types of pavement distress, milling, stripping, tack coat, mixture components, plant operations and limitations, and paving operations including compaction and the tender zone. A few minutes on life cycle cost analysis was also included.

The pavement/project design session provided some interesting exercises. The participants were divided into groups to solve design problems. The participants were divided into groups to solve design problems. Case studies provided descriptions of in-place pavement sections with pertinent traffic and condition information for a resurfacing project and for a widening project. The participants were challenged to select repair options and to develop appropriate mixture and layer thickness combinations for these projects based on the new Superpave Pavement Policy and specifications. Most of the participants do not routinely perform such tasks, so it was an enlightening experience for many.

The workshop appeared very successful. The actions taken by PennDOT to incorporate uniform standard policies, specifications and procedures for Superpave are expected to facilitate implementation in Pennsylvania.
Northeast Regional Calendar of Events

October 5-6, 1999  Annual Meeting North East States Materials Engineers Association
Atlantic City, NJ

October 7, 1999  Northeast Asphalt User/Producer Group Fall Meeting
Atlantic City, NJ

October 18-20, 1999  International Conference on Accelerated Pavement Testing
Reno, NV
Contact:  Nevada T2 Center, (702) 784-1433

October 27-29, 1999  7th Annual U.S. Hot Mix Asphalt Conference
Orlando, FL
Contact:  NAPA @ 1 - 888 - HOT – MIXX

November 18, 1999  39th Annual Bituminous Paving Conference
University of Illinois
Contact:  Sam Carpenter, scarpent@uiuc.edu

January 9-13, 2000  79th Annual Transportation Research Board Meeting
Washington, DC
Contact: TRB (202) 334-3214 www.nas.edu/trb

March 12-15, 2000  Association of Asphalt Paving Technologists
Reno, NV
Contact:  AAPT, (651) 293-9188

April 10-12, 2000  Superpave: Building Roads for the 21st Century
Denver Marriott Tech Center
4900 S. Syracuse Street
Denver, CO 80237
Phone: (303) 740-2531