

Minutes of the North Central Asphalt User Producer Group  
Annual Meeting  
Omaha, Nebraska  
January 28-29, 2004

Chuck Van Deusen, Co-Chair of the North Central Asphalt User Producer Group (NCAUPG), opened the annual meeting. He noted that the meeting was being co-hosted by Nebraska and Iowa.

Terry King, Executive Director of the Associated General Contractors of Nebraska, welcomed everyone to Omaha. He explained that Nebraska does not have a separate asphalt paving association. The AGC Asphalt Committee is the link between industry and the Department of Roads, and has a history of cooperative efforts including implementation of Superpave specifications and training efforts. They are looking towards the future, not complaining about old problems. King went on to discuss the current Senate and House highway funding bills and what they would mean for the states. He encouraged everyone to contact their legislators in support of increased highway funding. In closing, King thanked everyone for coming and hoped they would stay warm.

Mike Kvach, Executive Vice President of the Asphalt Paving Association of Iowa, also thanked everyone for coming to the meeting. He commented that he would like to see the NCAUPG grow. It is not enough to transfer technology; we need results as a User Producer Group to gain the support of the contractors. He cited test standardization as one beneficial product for the contractors that could come from this group. He urged everyone in attendance not to let the conversations die here, but to continue the dialog and efforts between meetings. Kvach also seconded King's remarks, noting that the Iowa DOT announced there would be 40% fewer let projects coming up due to funding constraints. Kvach urged everyone to contact their representatives to stress the importance of adequate highway funding.

Mike Heitzman, Iowa DOT, summarized the results of a survey on mix design practices in the region. Twelve states and one Canadian province responded to the survey. All of the states are using Superpave, but the province (Saskatchewan) is not. About half of the states say they have implemented Superpave as written in AASHTO. Contractors or private labs do the mix designs in 11 states and agencies in two. Seven agencies pay for the binder separately, but one is planning to change. All 13 agencies adjust pay depending on field density, and nine use binder content as a pay adjustment factor (including the seven who pay for binder separately). Further results of the survey will be written up and distributed by the North Central Superpave Center (NCSC).

John D'Angelo, FHWA, discussed Long Life Pavements for the Future. D'Angelo cited a 2002 report to Congress that shows we underfund what is needed to maintain our highway system by billions of dollars per year. We need to improve and extend the lives of our pavements by implementing:

- Mechanistic-empirical pavement design methods,
- Polymer modified binders,
- New materials characterization tests,
- Measures to reduce disruption (such as safer night paving),
- Innovative contracting techniques, such as PRS and warranties,
- Improved construction techniques, and
- 50+ year design lives.

D'Angelo also summarized an FHWA initiative to develop and distribute a guide to implementing the new mechanistic-empirical design guide. The Design Guide Implementation Team (DGIT) is hoping to educate and inform states about how to implement the design guide and to facilitate identifying problems and concentrating resources. This effort will include hosting workshops across the country.

The FHWA is also working with NAPA to sponsor regional workshops to discuss what hot mix construction issues states are dealing with and how they have been addressed. Current plans are to coordinate these small, regional meetings with the next round of user producer group meetings.

Mike Heitzman then led a group discussion of state uses of Long Term Pavement Performance (LTPP) data. Some states in the region have attempted to use the data, but until more traffic and materials data is in the database, there are limits to what can be done. Those states that have tried to use the data have only done so to a limited extent. Some states in the region, including Indiana and Kansas, are looking at setting up their own mini-LTPP studies to look specifically at their pavement performance.

John D'Angelo then returned to provide an update on FHWA's efforts in research and equipment. He summarized the status of the current ALF testing. He also reviewed the evolution of angle measurement in the gyratory compactor. The dynamic internal angle is a function of mix stiffness, so to calibrate there is a need for a "standard mix." Since no such thing exists, mixless angle verification devices have been developed. These devices simulate hot mix in the mold, but have a fixed stiffness. FHWA is sponsoring a six-month study at the Asphalt Institute and University of Arkansas to evaluate these mixless devices and compare them to the DAV. FHWA is continuing to work with gyratory compactors and the proposed performance tests. The FHWA trailer now carries the performance testing equipment, and is using it across the country. Another promising line of work is using imaging techniques to analyze aggregate shape and texture. The eventual goal is to use these new devices and techniques as inputs to mechanistic-empirical pavement designs using actual measured mixture properties.

Next, Lon Ingram, Kansas DOT, summarized an AASHTO-FHWA scanning tour looking into the use of Superior Materials, Advanced Test Methods and Specifications in Europe. Ingram was part of a team that toured the UK, Denmark, Germany and the Netherlands. Their goal was to learn about the approval processes and superior materials used in Europe that could help materials approval and specifications in the US be more rapid, less expensive, more efficient and more uniform. European Union standardization is leading to improved efficiency and competition. Warranty contracts are widely used and often include quality, life-cycle costs and eco-friendliness as award considerations. The team learned of a number of new, accelerated evaluation techniques as well as new processes and innovative materials for a wide variety of applications.

Environmental considerations loom large in Europe. Noise issues have a great impact on pavement selection and are so important that the auto, tire and pavement industries are working together to find solutions. Sustainability of resources is another significant concern, leading to a 100% reuse policy and taxes on use of virgin aggregates. The team brought home a lot of ideas that will be included in a report and may lead to improvements in how we do business here.

Becky McDaniel then provided the annual overview of activities at the North Central Superpave Center. She focused first on exciting on-going research projects dealing with pavement friction and noise. She reported that, as part of a study funded by Indiana, Iowa and the Institute for Safe, Quiet and Durable Highways, the NCSC would soon have a small, portable dynamic friction tester and circular texture meter from Japan. These two devices could be used as research tools, for pavement forensics, to evaluate new pavement surfacing materials and to investigate other

issues such as noise and variation in surface texture (segregation, wear, etc.). She also showed data from an Indiana field trial of a porous asphalt friction course compared to an SMA and a conventional Superpave surface. Noise measurements at the tire and along the side of the road show significantly lower noise generation in the porous surface. NCAT assisted in this study by running their close proximity noise trailer over the test sections. McDaniel also summarized continuing training efforts, newsletter publication, and continual development of the website and searchable database. Lastly, she announced that the NCSC would be moving its labs into new quarters in a large addition to our current facilities at the Indiana DOT. The existing lab space will be remodeled into a suite of offices.

Laird Weishahn, Nebraska DOR, summarized the major topics of discussion at the Technician's Workshop, which was attended by over 100 people. Highlights of the Binder session included discussion of:

- Mixing and compaction temperatures for modified binders
  - A concern for both laboratory and field
- Addition of anti-strip additives
  - Issues about the logistics of it being added, such as uniformity of concentration levels
- Ever-increasing number of ways to modify PG binders
  - DOT's are not comfortable with the various methods being used. It is difficult to stay "educated" on this issue.
- Binder testing procedures
  - The BBR training and discussion brought to everyone's attention the need to continually be aware of proper procedures and finding methods to improve accuracy.

In the Aggregate session they discussed:

- Fine Aggregate Angularity
  - General agreement that FAA is a good procedure.
  - Some states with poor aggregate have added other specifications to improve mixtures.
- Other topics discussed in the session....
  - Soundness and quality testing of aggregate.
  - PG Binder grade "bumping."
  - Acid modified binders and reaction with aggregate.

Discussions in the Mix Design Session focused on:

- RAP usage
  - Varies between states
  - PG binder grade bumping along recommended guidelines.
- Asphalt Pavement Analyzer
  - Two states use it regularly and others are experimenting with it.
  - Hamburg wheel is getting a lot of attention.
- Round Robin Testing
  - All states are involved to some degree, and contractors are involved in some states.
- Moisture Sensitivity Testing with T-283
  - All states are using it for design and some for plant-produced mixes.
  - There is general concern about "variability" of test results.
- Gyrotory Angle Verification
  - Some states are using it at this time.
  - Other states are paying close attention to this development.

- Other issues ....
  - Some Marshall mixes still being used.
  - Film thickness, Iowa has it in their specifications and Minnesota has a pilot project going.

And the Construction and Quality Control group discussed:

- Standardization of testing procedures and reciprocity
  - A big issue for contractors, consultants and some states
- Positive dust control
  - An issue that is starting to receive the attention it deserves. It is very important to volumetric numbers.
- QC/QA sampling and testing
  - Who, where, when and how.
- Joint construction
  - Tapered joint and other methods and workmanship requirements for all types.
- Laydown and rolling operations
  - Adjustments in screed heights and problems created.
  - Rolling patterns.
  - Operating equipment as per recommendations of equipment manufacturers.
- Density testing
- Moisture sensitivity testing
  - This continues to be discussed.
  - Payment for anti-strip additive.
  - Types of additives, such as liquids, lime and others.
- Mixture types
  - Leveling courses.
  - Fine and course gradations.
  - SMA's.
- Smoothness testing
  - Testing bands: zero, 0.1, 0.2 blanking bands.
  - Different types of equipment being used.
- Technician training and certification
  - Who, where, when and cost.

That summary concluded the first day of the meeting.

Lon Ingram opened the second day of the annual meeting by thanking the industry sponsors of the evening reception and the exhibitors. Ingram then introduced Brian Prowell of NCAT, who discussed Emerging HMA Technologies. Prowell discussed Warm Asphalt Mixtures, European technology that is becoming attractive in the US to reduce production and laydown temperatures, emissions, energy costs and binder aging. An NCAT study is evaluating warm asphalt technologies for possible US application. Concerns include the required “curing” time, binder effects, and potential for moisture damage if aggregates are not thoroughly dried. NCAT is also looking at appropriate compaction levels for SMA mix designs. They are evaluating compaction and degradation of the aggregates in the SMA. SMA is also the focus of another project looking at the use of RAP in SMA mixtures, particularly utilizing high frequency screening decks to fractionate the RAP into fine and coarse fractions. Lastly, Prowell discussed an upcoming demonstration project that NCAT is organizing to showcase automated quality control and real-time testing. The Alabama DOT is funding the project that will include an open house

demonstrating automatic belt sampling, moisture content determination, gradation, binder viscosity, binder flow meter, HMA temperature and robotic truck sampling.

Mike Heitzman, Iowa DOT, took the floor to describe Iowa's mix design verification software. When presented with a contractor's mix design, how does the DOT determine if it is a reasonable design? Iowa's system relies on basic mixture volumetrics and the relationship of  $G_{mm}$ ,  $G_{se}$  and  $G_b$ . This relationship can be expressed as:

$$\frac{100}{G_{mm}} = \left[ \frac{(G_{se} - G_b)}{(G_{se})(G_b)} \right] Pb + \frac{100}{G_{se}}$$

which is the equation of a straight line ( $y=mx+b$ ). The known range of aggregate specific gravities in Iowa means that the quantity in brackets, or the slope of the line, must be between 0.58 and 0.62. This relationship can be used to identify good vs. poor mix designs and to identify possible bad data points. The verification has been incorporated into Iowa's mix design software, SHADES. Heitzman cautioned against using Iowa's standard deviations directly. Each state should analyze their own database of mix designs, but this does represent a possible tool to improve mix designs.

Dave Newcomb, National Asphalt Pavement Association, then discussed SMA's, open graded friction courses (OGFC's) and porous asphalt surfaces. He reported that SMA's have been used successfully to minimize rutting and cracking, however attention to detail is essential. The shape of the aggregate is critical to good performance; cubical aggregates are needed. The increased film thickness (25% greater than conventional mixes) means the mix is durable and impermeable to air or water. Although SMA's are initially more expensive, their longevity results in much lower life cycle costs. OGFC's differ from SMA's in that they are deliberately designed to be permeable to wick away water from the surface, improving wet weather safety. They can also provide lower noise levels. The air void content of these mixes is greater than 18%. Crushed aggregates, modified binders and fibers are important to ensure success. Lastly, Newcomb summarized porous pavements, which are designed to actually act as a retention pond, draining away water or holding it until the underlying soil can take it. This technology can be used to reduce surface runoff, control erosion, maintain water quality, recharge groundwater and more. It has been used in such environmentally sensitive areas as Walden Pond. Again, attention to detail is important, as is building in redundancy in case one water path gets clogged.

Next, Marvin Traylor, Illinois Asphalt Pavement Association, spoke about perpetual pavements. He compared the costs of PCC and HMA pavements in terms of initial costs, out year costs and user delay costs. Traylor pointed out that for most routes, 65% of the total life cycle cost is due to initial costs, but that on congested routes, user delay costs become significant and can account for 50% of the total life cycle cost. He then summarized the AASHO Road Test and how design procedures for PCC and HMA were developed there. The basic tenet of the AASHO design was that more traffic implied the need for a thicker pavement. The AASHO design procedures are being replaced by mechanistic design procedures that consider the relationship between applied forces and material responses. The limiting strain theory suggests that if the pavement deflection is low enough, fatigue damage will not occur. This limiting strain value can be reached at about 13.5 inches of pavement thickness, based on Illinois' fatigue-based mechanistic design procedure. This is the basis for perpetual pavements. A fatigue resistant base is capped by a surface course that is periodically and efficiently renewed (every 20 years or so) providing a very long-lived pavement structure. Traylor then showed that perpetual HMA pavements could be constructed to offer lower initial costs, lower out year costs and lower user delay costs than PCC.

Cliff Ashcroft then spoke on behalf of the Rubber Pavements Association on Ground Tire Rubber in Asphalt Paving Applications. He reviewed the different processes for adding crumb rubber to asphalt, including the wet field blend, wet terminal blend and dry processes. Ashcroft said asphalt rubber binder leads to better aggregate retention; reduced draindown; increased resistance to moisture damage, bleeding and rutting; and reduced age hardening of the binder. He also summarized the benefits of asphalt rubber OGFC, which include increased skid resistance, reduced noise, reduced splash and spray and more. He cited long-term performance studies in Arizona, California and Texas. Lastly, he showed Arizona data that demonstrates the noise reducing capabilities of an asphalt rubber friction course compared to various tining and grinding techniques for concrete. Arizona is the only state that is currently allowed by FHWA to use pavement type as a noise mitigation strategy.

Lon Ingram then took the floor again to show the results of the NCAUPG logo contest. A logo submitted by a fellow from Poland was selected as the new symbol for the NCAUPG. He will be sent an award of \$50. Ingram also announced that the next meeting of the NCAUPG will be held in Indiana January 25-27, 2005. The 2006 meeting dates, January 10-12, will be slightly different because the Transportation Research Board meeting is changing dates that year.

Erv Dukatz offered a “modest proposal” of where the NCAUPG should go from here. Dukatz said the goal of the group is to get more participation from around the region by returning to the reason for having a user producer group, which was to solve common HMA problems. He noted that we have ten states and two Canadian provinces in the region, which results in 12 different ways of designing and testing HMA. And, we do not know what differences actually result from the different procedures. His proposal, then, is for each state in the region to pick one or two mixes to send to all other agencies in the region. The originating state will send blend percentages and design asphalt content, plus enough aggregate and asphalt to replicate the mix design. Each receiving state will run their test procedures to validate the mix design. All results will be sent to the NCSC for compilation and reporting of results and differences. The intended result is to determine if there is a real difference in the results between agencies. If not, test standardization becomes more achievable. Dukatz also feels this will generate interest in the next meeting from agencies, contractors, consultants and others. The level of interest in this project seemed high. McDaniel will work with Dukatz, the industry state executives and the NCAUPG Management Committee to get this project off the ground so that results can be presented at next year’s meeting.

Chuck Van Deusen closed the meeting by thanking everyone involved in organizing the meeting and encouraged everyone to join us again next year in Indiana.