Warm Mix Asphalt (WMA) Technical Working Group

Meeting Minutes
Friday, March 3, 2006
8:30 am – 1:00 pm

Conference Room of the
National Asphalt Pavement Association Office
5100 Forbes Blvd.
Lanham, MD 20706

Introductions

Tim Docter and Matt Corrigan welcomed the attendees to the meeting.

Individuals introduced themselves. The following were in attendance:

Tim Docter, Keeley & Sons
Harry Bush, Vulcan Materials
Chuck Van Deusen, Payne & Dolan
Matt Corrigan, FHWA
Brian Prowell, NCAT
Eric Harm, Illinois DOT
Tom Baker, Washington DOT
Dale Rand, Texas DOT
Margaret Cervarich, NAPA
Gary Fore, NAPA
David Newcomb, NAPA
Fred Frecker, Flexible Pavements of Ohio
Richard Schreck, Virginia Asphalt Association
Adam Fisher, AASHTO
Jim Melius, Laborers Health

WMA History

Gary Fore presented an overview of the history of WMA from the industry's perspective. The Bitumen Forum in Germany began looking at ways to reduce emissions in 1997, and Warm Mix technology is one of the avenues they pursued. European interest in the technology has accelerated recently as a means of reducing greenhouse gasses in response to the Kyoto agreement. In 2002, NAPA sponsored an industry scanning tour to Europe to introduce U.S. contractors to the process. An initial meeting of NAPA, FHWA and NCAT was held in 2003 to explore the potential of the technologies within the U.S. That same year, the technologies were presented at the NAPA Convention in San Diego. It was featured as a demonstration project at the World of Asphalt in 2004. The World Health Organization is planning a review of the effects of asphalt fume, and NAPA wants to have a proactive industry response by encouraging research for fumes reduction,

including Warm Mix.

Current WMA Technologies

Dave Newcomb and Brian Prowell briefly reviewed the existing technology. The presentation is attached. Currently, the following technologies exist:

WAM foam is a process jointly developed and marketed by Shell International and Kolo-Veidekke. Heated aggregate is coated by a soft aggregate and mixed. This is followed by the application of a foamed hard asphalt.

Aspha-min is the trade name for a manufactured mineral additive called zeolite. Zeolite is aluminum silicate that has a very small amount of water trapped in its lattice structure. Upon heating, the water is released. In the HMA plant, the zeolite is added to the hot aggregate, and when the asphalt is added, the water causes a foaming to occur.

Sasobit is a product of Sasol Wax America. It is a Fisher-Tropsch wax produced during coal gasification. It is distinguished from asphalt wax by having longer chain molecules which keep it from precipitating out of the asphalt. The wax lowers the viscosity of the binder at working temperatures and hardens at ambient temperatures.

Evotherm is the name of a product from MeadWestvaco. It is a high-residue asphalt emulsion that has chemical additives to enhance the adhesion of the binder to the aggregate. It is added to the plant through the existing asphalt lines.

Low Energy Asphalt is a French process currently being marketed in the U.S. It relies on wet sand being added to hot coarse aggregate, followed by the introduction of the asphalt binder. This creates a foaming action.

NAPA/Industry Involvement

Tim Docter started the discussion of the industry's perspective. We need to discuss potential advantages of the technologies as we proceed in the development. However, we need to make sure we do not negatively impact the performance and quality of HMA. We need to prove the technology and get "buy-in" from customers.

FHWA Involvement

Matt Corrigan presented FHWA's perspective of being proactive on the development of new technology. FHWA was brought in early to interact with NAPA and NCAT to investigate the potential for WMA. The quality and performance of the product is of paramount importance to FHWA while improving the environmental friendliness of asphalt mixtures. They have been involved with some of the field trials. One of the driving forces behind the formation of this TWG is to help coordinate the activities of demonstration projects and to help guide research efforts. FHWA will draw upon the success of SMA implementation to model the future efforts on WMA.

Adam Fisher will help in the transfer of the technology to AASHTO subcommittees. He will suggest it as a focus theme for AASHTO.

SHA Perspective

Eric Harm sees the push by environmental groups to use the technology and sees the industry as being a driver. Both of these are positive developments. The longer the implementation takes, the bigger the problems will be. We need to draw on experience from Superpave, SMA, and modifiers to figure out how to accelerate the implementation. Would like to see implementation within two years. Anticipates potentially large benefits.

Tom Baker is excited about the technology, but is concerned about the overmarketing of the processes. It is too early in the process to be "pushing the edge of the envelope" in claiming paving tempertures of 140 degrees F. The performance concerns need to be investigated and mitigated if necessary. Reducing compaction effort and getting density while paving in late season would all be encouraging. Performance specifications are needed to get this done.

Dale Rand sees a lot of potential in reducing emissions and improving paving and compaction. Non-attainment areas in Texas are critical, but how will it get off the ground? Who will pay the extra cost per ton to implement it? What is the benefit to the DOT to specify it and require it? With HMA prices already increasing, how can we pay even more for the final product? How will we test the binders, especially with emulsions? How will the product bond with the lower layers if paving occurs in the late season or in night paving conditions? Bonding between layers could be an issue with this material, especially in cold weather. He would like to see a centralized type of study before large numbers of test sections are put down.

Labor Perspective

Jim Melius says from a labor perspective, both lower fumes and later paving seasons may be big benefits. There is a lot of pressure to get more late season projects. Environmental drivers make it important to keep the industry proactive. We should seek research funding from other federal and state agencies. The quality of the product is important and needs to be addressed. We need to explore funding for broad research into working conditions and emissions as well as quality.

Discussion

Harry Bush has a lot of optimism in the face of some of the environmental pressures. Some California plants can only work 5 days a week under current technology, where lower temperatures might allow them to work longer. Longer paving season is an important consideration. Competition might drive down added costs. There are many technical questions to be resolved in design and production. Different technologies may require different approaches to mix design. It is important that agencies not require its use

without understanding the lilmitations. It would be good to have a large-scale, inclusive study of various technologies.

Brian Prowell says NCAT's mission is to improve HMA, and that improved densities or improved ability to haul the material longer distances while keeping the quality are important considerations.

Richard Schreck stated that there are many parallels to the SMA implementation. Some DOTs have a zero tolerance for failure of experimental demonstrations. There is concern about people getting too far out ahead of the technology. The TWG needs to develop guidelines to encourage good practice and material useage. Definitions need to be developed and there needs to be a centralized effort to develop design and construction protocols.

Eric Harm stated that there are currently only 5 technologies as opposed to 50 DOTs developing their own methods (as in SMA) to address issues. It may be easier to control our own destinies if we can get our hands around the technology before the states go their different ways in trying and implementing the technologies.

Fred Frecker said that SMA is not a generally applied technology, but applied as a special technology. Would like to see WMA not be labeled as a best practices and then mandated, but rather as a special technology to be used in particular applications. Mandating could result in hurting the life-cycle cost of the material.

Jim Melius and Gary Fore suggested that it may come down to broad application if outside pressures grow.

Chuck Van Deusen would like NCAT to be a central data collection center for the research.

Richard Schreck stated that the technology needs to work here, and the costs will work themselves out.

NCAT Activities

Brian Prowell updated the group on the latest NCAT results (presentation attached). They are working on a performance-based product acceptance – compaction, curing, rutting, modulus and moisture sensitivity are in the acceptance plan being modeled. All WMA technologies evaluated showed better compaction, equal modulus, mixed results in rutting, and mixed results in moisture susceptibility. When anti-strip additives were used, better performance was seen in WMA. Larger demonstration projects are needed along with a product evaluation system. We need better understanding of rutting and moisture damage. Need procedures for QC/QA (is a new approach needed). Need a means for developing specifications.

Draft Charter

A discussion of the draft charter ensued. Need to add NCAT to Section A (Organizations) of the charter. Need to incorporate additional benefits to the Preamble.

Article III – Section A: Mission
- Use the terms "evaluate", "validate" and/or "review"
- Eliminate "promote" and "adopt"
- Promote concept of WMA instead of WMA

Article III – Section C: Goals
- Publish document that lists Goals and Best Practices for WMA
- Publish on NAPA website
- Create framework for WMA Data Collection for Central Group
- Create Test Protocol for Emission Testing and Data Collection for Central Group
- Move Draft Goals #6 and 8 under Goal #4
- Draft Goal #5 is how we do #2
- Draft Goal #2 is the overriding Goal
- Draft Goal #1 change "Communication" to "Technology Transfer and Guidance"
- Add "proper use of" to some statementes
- Add "documentation of environmental data to quantify environmental and energy benefits to Goal #9

Need a testing and evaluation protocol for demonstration projects.

Funding mechanisms seem problematic for environmental testing. Pooled funding and large projects encompassing multiple technologies seem to be the most attractive options at this point. Perhaps identifying willing states immediately (e.g., Texas or Ohio), and then applying the protocols would be better than pooled funds approach. Perhaps suppliers would donate materials for a couple of large projects so as to not raise the cost of the pavements. Is money available from EPA? Perhaps, but there are attendant burdens as well.

There is an urgency in trying to identify projects, testing, and conditions.

Communications

Margaret stated that this group needs to be nucleus for communications. How is communications to be handled? AASHTO and WASHTO need to be in the loop. The APC at WOA is another venue. People need to know about the group. What is the make up of the group and its composition. HMAT article, flyer at the WOA, Public Roads, the AASHTO Journal. Adam will prepare AASHTO Journal article and would like input from individuals about the importance of the TWG. The articles should direct those thinking about projects to notify the group. Web site might contain a project registry and

other information. Margaret would like ideas on what information should go up on the web site.

Assignments

Overall Publication: Dave will put this together with help from Jon Epps. It will be comprised of three parts that will be put together.

> Materials Testing Framework: Brian Prowell will head up this effort.
> Emissions Testing Framework: Gary will head group.
> Construction Guidelines: Brian and Richard will put it together with help from Harry.

Co-Chairs will work on how meetings are to be conducted. How to handle interactions with technology vendors and their possible attendance at meetings. Are there any FHWA restrictions on this type of group?

Eric Harm will compile a list of current research efforts.

Dale and Fred will work on setting up field trials in Texas and Ohio.

Tom Baker will work with the Communications group and prepare a survey for the AASHTO Subcommittee on Materials to find out what states are contemplating WMA trials and the details of those projects.

Tim asked if a group is needed to clarify definitions for WMA. Should there be a two-tiered definition? Small temp reduction vs. large temp. reduction?

Next Meeting

June 12, 2006 at the NAPA office.