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LOCAL HIGHWAY TECHNICAL
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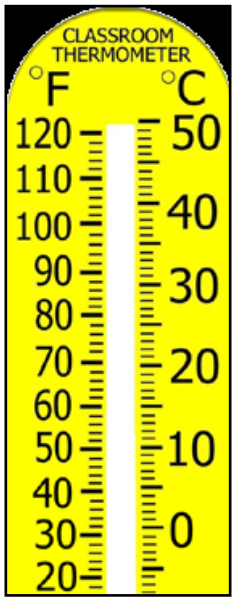
WARM MIX ASPHALT REDUCES PRODUCTION TEMPERATURES



New warm mix asphalt (WMA) technologies allow asphalt mixtures to be produced and placed at significantly lower temperatures. The temperatures can be reduced by as much as 30 percent while still allowing the asphalt binder to adequately coat the aggregate during mixing at the plant and achieve the desired workability at the paving site. This is accomplished by reducing the viscosity and increasing the workability of a given asphalt binder at a given temperature.

POTENTIAL BENEFITS

Warm mix asphalt's most often mentioned benefits during mix production are:

1. Decreasing the energy and fuel consumed to make hot mix asphalt.
2. Reducing possible emissions and odors from plants.
3. Improving the working conditions at the plant and paving site.

Reducing emissions is especially critical around large cities that have tight air quality restrictions.

Some road agencies are exploring the use of WMA to extend the paving season. With WMA, mixes can remain workable at cooler temperatures, increasing the time available for compaction. This may make WMA a feasible option for those end-of-season projects that must be completed before winter.

Another potential benefit relates to the mix not being exposed to the elevated production and placement temperatures typical of hot mix asphalt (HMA). Less oxidative hardening of the binder takes place with WMA, possibly reducing a mixture's susceptibility to aging and cracking.

Of course, with less hardening comes the potential for greater susceptibility to early rutting until the pavement has oxidized somewhat in service. Strategies need to be developed for determining when it is appropriate to select a higher performance grade to address the issue.

MASSHIGHWAY RESEARCH

MassHighway was the first state in the nation to use Sasobit® to produce a WMA. A portion of I-95 between Danvers and Rowley was resurfaced about three years ago using Sasobit® which contains a wax additive. MassHighway will be using WMA in the HOV lane on I-93 in the Quincy/Milton/Boston area. WMA was chosen for this high traffic area because more pavement could be put down in a shorter period of time.

Under consideration are a variety of WMA additives including synthetic zeolite (a crystalized sodium aluminum silicate), Sasobit® (a Fischer-Tropsch paraffin wax), and Evotherm® which uses a chemical additive technology and a "dispersed asphalt technology" delivery system. These new technologies appear to allow the production of WMA by reducing the viscosity of the asphalt binder at a given temperature. This reduced viscosity allows the aggregate to be fully coated at a lower temperature than what is traditionally required in HMA production.

MassHighway is also sponsoring research conducted by Dr. Walaa S. Mogawer at UMass/Dartmouth on the labortory and field evaluation of WMA technology to determine its applicability for Massachusetts. This study will document construction data of production and placement of WMA, construct stone matrix asphalt and WMA specimens at the contractor's plant, and monitor performance in the field.

TECHNICAL WORKING GROUP

The FHWA and NAPA formed a national WMA Technical Working Group in 2006. Members of the group include representatives from several highway agencies, state asphalt paving associations, HMA contractors and other industry groups such as the Asphalt Institute, National Center for Asphalt Technologies, American Association of State Highway and Transportation Officials, etc. The mission of the technical working group is to implement proactive WMA guidance, policies and procedures to evaluate and implement WMA technologies that contribute to high quality and cost-effective pavements. Specific guidelines include:

- ☐ Technology transfer and implementation
- ☐ Research needs
- ☐ Procedures for project and material approval
- ☐ Testing and performance management protocols
- ☐ Guidelines for mix design and construction

NCHRP PROJECT 9-43

The National Cooperative Highway Research Program (NCHRP) has just recently awarded Project 9-43, Mix Design Practices for Warm Mix Asphalt Technologies. The objective of this $500,000, 36-month research project is to develop a performance-based, mix design procedure for WMA in the form of a manual of practice. The method will be based on Superpave, include a suite of performance tests and be applicable to any of the WMA technologies.

AWAITING ANSWERS

Although various WMA technologies seem to offer promising benefits, many questions need to be answered regarding mix design, performance and cost before their use becomes more concentrated in the field. Because of the variety of products and processes involved, this is no small challenge but national initiatives such as the working group and Project 9-43 as well as statewide research should provide many of the answers.

Reference: MASS INTERCHANGE, Volume 22, Number 2, Spring 2008