

COMMENTS FOR
“UPDATE ON WARM MIX ASPHALT: AEMA-ISSA-ARRA MEETING, BONITA
SPRINGS, FLORIDA, 16 FEBRUARY 2006”
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SLIDE 1. The following presentation will cover some of the technical progress made in 2006 using Evotherm emulsion-based warm mix asphalt (WMA) technology, but also include some observations that I think might signal a slight shift in our hot mix industry, not just in acceptance of emulsion-based warm mix technologies but in some ways that may provide a broader benefit to all the emulsion industry.

SLIDE 2. Very briefly, we will cover where we ended 2005 and how that was different than what happened in 2006. 2005 saw the main emphasis for WMA worker exposure to fumes at the paver. The ability of Evotherm WMA to reduce fumes was proven, and so in 2006, we moved on to more field validation of the technology. In 2006, we saw introduction of new drivers in the market. And then I will close out with some observations about this shift in the industry: we are not so much as pushing WMA initiatives as they are being pulled through by others, contractors, agencies, and associations alike.

SLIDE 3. Again in 2005, the reclassification of asphalt fumes by the International Agency for Research on Cancer (IARC), which is part of the World Health Organization, was expected by 2007. That deadline has now slipped to perhaps beyond 2008.

SLIDE 4. Even though the review date for asphalt fumes reclassification may have slipped, we now have conclusive data in hand from three field trials that demonstrate that total particulate matter (TPM), benzene soluble matter (BSM), and total hydrocarbons can be reduced using Evotherm emulsion-based WMA. Here we see in separate studies in Indiana, Ohio, and Texas, we saw TPM reduced in Evotherm mixes by 41-77% compared to the HMA controls. Similarly, BSM too was reduced significantly by using Evotherm mixes. The data from Texas has still to be reviewed for statistical significance and for that reason we did not publish it yet.

SLIDE 5. Given the reprieve from the IARC review, we continued to work with early adopters around the world to construct Evotherm pavements using their materials and construction practices. To date, we have participated in four projects in Canada, 12 in the US, two in Europe, two in South Africa, and four in China.

SLIDE 6. In these projects we have used a variety of different aggregate types and gradations, including gap and SMA gradations. A wide range of binders has been used. Likewise and assortment of production plant configurations have been used successfully. And lifts from $\frac{3}{4}$ of an inch to 3 inches thickness have been constructed. To date all pavements are performing well.

SLIDE 7. One of the more interesting projects, was the National Center for Asphalt Technology (NCAT) test track project. At NCAT, which operates under the auspices of the National Asphalt Paving Association (NAPA), we placed Evotherm emulsion-based WMA on two sections, E9 and N1. On section N2, we place Evotherm base and binder layers, topped off with an HMA surface mix. After roughly 600,000 ESAL's the Evotherm sections showed no rutting. And these pavements were loaded immediately after construction with the typical caravan of four, 150,000-lb tractor trailers.

SLIDE 8. In 2006, market drivers such as reduced stack emissions, fuel savings, and higher RAP usage came to the forefront. We have completed some projects showing these objectives can be achieved. But more work is underway.

SLIDE 9. In 2006, we saw interest growing rapidly across all paving industry segments: every trade magazine mentioned Evotherm; every US conference I attended had a warm mix session. We also saw the leadership role in development of WMA technology shifting: state APA's invited more participation from the WMA technology suppliers; the Asphalt Institute is participating in studies of the fundamental binder properties of WMA asphalts; several universities have WMA studies underway; and as already mentioned, the NCAT study was published.

SLIDE 10. Interest is also illustrated in the development of National Cooperative Highway Research Program study to develop a mix design procedure for WMA, NCHRP 9-43. This is, of course, managed by TRB, sponsored by AASHTO, and assisted by the FHWA, but participants will include numerous other groups key to the HMA industry.

SLIDE 11. So, I think it is possible to connect the dots and see the development of WMA as another tool in the pavement preservation toolbox. The emulsion industry is familiar with the tools it provides: chip seals, slurries, etc. The HMA industry has relied heavily on the tool of thin overlays. These occasionally have some challenges. WMA may provide another tool that meets these density, delamination, and cold weather challenges.

SLIDE 12. So, for 2007, we forecast accelerated growth in WMA projects, in number, size, and scope. Designs and specs should begin to come out of the NCHRP study. And the emulsion and HMA industries will continue to strengthen their partnership to address issues confronting the overall paving industry.