

Warm Mix Asphalt

NSF FHWA Workshop

Virginia

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Intro to WMA

- Wide range of technologies that increase the workability of asphalt mixes at lower temperatures
 - Chemical additives
 - Chemical foaming
 - Mechanical foaming
- Many have been around for quite awhile
- Use is increasing rapidly
 - Lower mixing and compaction temperatures, or
 - Normal mixing temperatures but can haul farther or in place in colder weather

Potential contribution to sustainability

- Potential for reduced energy costs through lower mixing temperatures
- Potential for reduced pollutant emissions due to lower temperatures, especially from rubberized and stiff binders
- Potential for better quality extending materials life from better compaction

- Potential risk of poorer aggregate coating and shorter life
- Potential for poor compaction, roughness due to tenderness
 - Each product is fairly unique, different handling characteristics, different uncertainties, different levels of experience

Gaps in knowledge

- Need more information regarding potential energy savings and emissions
 - Conventional binders
 - Rubberized and polymer modified binders
 - Stiff binders
- Need to develop experience and assessment of risks with each new technology
 - Compaction characteristics
 - Early-age rutting
 - Long-term performance
- Need fundamental understanding of what each is doing to the binder and mix (is it exactly the same as HMA once it cools?)
 - Short-term
 - Longer-term

Research questions

- For each additive or process
 - What are construction and short term performance risks for mixes to be used
 - Question of whether a “permissive” specification has low enough risk, or field experience and/or performance-related laboratory testing or APT needed for each new entrant into the market
 - What does the process or additive do to the binder?
Short and long-term
 - What does the process or additive do to the mix?
Short and long-term

Research questions

- What are the energy savings benefits?
 - Different mixing technologies
 - Different mixes (in California particular interest in rubberized binders)
- What are the emissions benefits?
 - Same as above
- Are there life cycle benefits from energy and emissions?
 - Accounts for later performance, and upstream dis-benefits
- All of above questions for range of applications (mixing technology, paving season, mix types, etc)

Research questions

- Variability and difficulty of obtaining good results with each technology
- Questions to be answered by the market for each market:
 - What is the most cost-effective WMA technology
- Development and deployment questions:
 - How and whether or not to specify
 - How to assess new technologies (or not worry about it)
 - How to assess long-term performance