

AK Hwy. MP 1267 – 1314 Rehab.
Warm Mix Asphalt (WMA)

Project Engineer: Jason Sakalaskas

Contractor: Great Northwest Inc.

Project Superintendent: Kelly Painter

HMA & WMA Project Summary

- Total HMA & WMA Placed 90,000 Tons
- Total HMA Placed in 2008 was 59,000 Tons
- Total HMA & WMA Placed in 2009 was 31,000 tons
 - Total HMA was 16,000 Tons
 - Total WMA was 15,000 Tons

Alaska Hwy MP 1267 – 1314
Warm Mix Asphalt

- Great Northwest approached the Department
- Researched warm mix and no down side was discovered except the "Unknown"
- Specification do not prohibit warm mix
- FHWA agreed to make this an experimental feature
- Placed 11,000 tons of WMA from MP 1303.9 to 1308.6 over a 4 day period.

WMA – Experimental Feature

- Comparison of HMA and WMA
- Tests to include modulus, flow, moisture susceptibility, indirect tensile strength
- Constructability issues
- Long term performance
- Assessment of suitability of WMA
- Report to be issued at the end of 2012

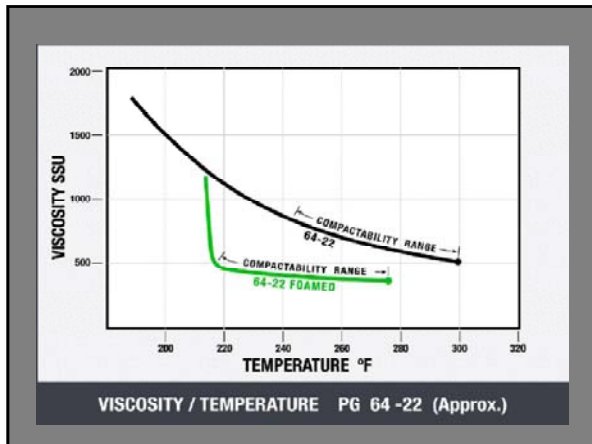
Warm Mix Asphalt

- “Foamed” Method



Warm Mix “Foamed”

- Foamed method creates microscopic bubbles in the AC lowering viscosity.
- Allows mix to be prepared and placed at temps 50 – 100 degrees lower than normal HMA.
- 14% Less Fuel
- Increased Workability
- Claim of longer life pavements due to less aging of the oil in the plant.
- Claim there is a reduction in vapor emissions during production and placement.
- No increase in mixture stiffness thus shouldn't increase fatigue cracking in cold weather unlike other additives.

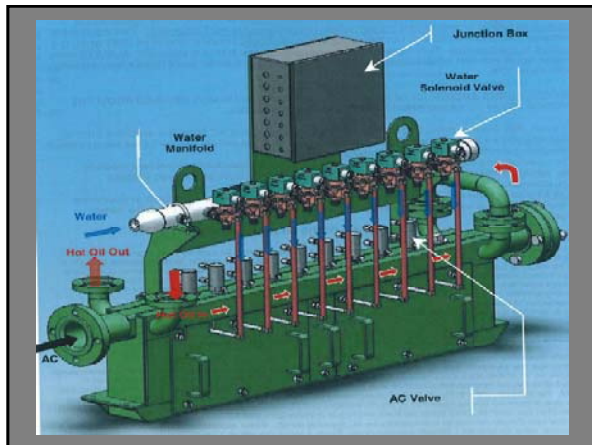


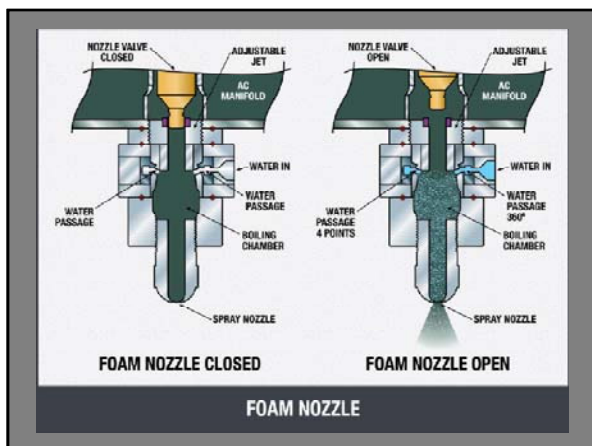
- ### Modifications to AC Plant
- Foaming Unit
 - Water Tank
 - Associated Piping
 - Removal of Flights in Drum
 - Removed flights to create less of a veil to get more heat to bag house.
 - This will change depending upon aggregates and weather.

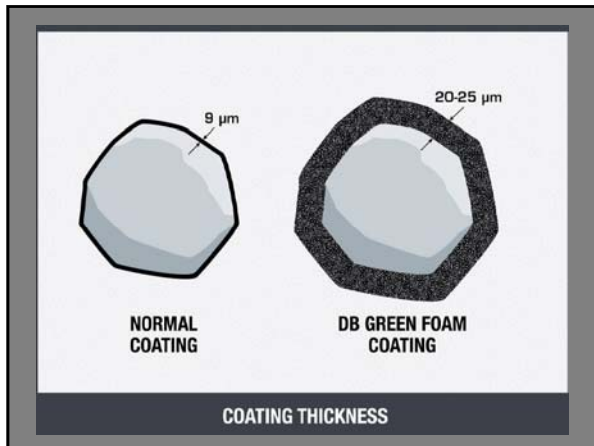


WMA Equipment









Modifications to Lay Down

- Possibly need less rollers to achieve compaction. This will only be known with more experience with the product.
- Psychological – Getting crew to try and to become comfortable with the new product.

WMA – Alaska HWY

- Observations:
 1. Workability – Definitely more workable at lower temperatures.
 2. Could have easily been over rolled.
 3. Rollers had to compact further behind paving operations thus longer finishing time.
 4. Less heat and probably less fumes.
 5. Density Results when averaged were as follows:
 1. Project Average for HMA Mat (95%) Joint (92%)
 2. Project Average for WMA Mat (95%) Joint (93%)

Moisture Susceptibility

Concerns were raised about the potential for stripping

- Water added is about 1 pound per ton of mix which is less than .05% (less than 1% of weight of liquid AC).
- Newt Bingham took samples from the project and had T-283 stripping tests ran on both the HMA and WMA.

- Overview of the T-283 antistrip test procedure;
 - the mix is reheated and 4" diameter cylindrical samples are compacted
 - one set is conditioned – vacuum saturated, then frozen and then thawed
 - a duplicate set is held at room temperature
 - indirect splitting tensile strength (ITS) is performed and the ratio of conditioned strength to the unconditioned strength (TSR) and the fractured face is evaluated.

Moisture Susceptibility

- Test Results:
 - TSR for AK Hwy HMA = 95%
 - TSR for AK Hwy WMA = 93%
 - Superpave requires 80% min.

Successful use WMA

- Constructability
 - Fairly easy and economical to modify asphalt plant
 - No major problems encountered during placement
 - Empirical testing during production and placement didn't show any signs of a poor quality asphalt

Additional Testing and Further Monitoring

- Additional test specimens were taken both of the HMA and WMA and provided to Jenny Liu Ph.D. AUTC for additional superpave type tests which are beyond normal construction testing.
- Continue to assess the performance of the WMA test strip for pavement distress and thermal cracking and compare this with the HMA which was placed using the same materials and conditions.

Questions?