

WELCOME

WARM MIX ASPHALT (WMA) DEMONSTRATION

*Madden Contracting Company
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Louisiana Asphalt Pavement Association*

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CHALLENGES AND OPPORTUNITIES

WHAT DOES THE FUTURE HOLD?

- ANNUAL ENERGY AUDITS FOR AN ASPHALT PLANT
- WHAT IS THE CARBON USAGE (FOOT PRINT) TO PRODUCE A TON OF HMA/WMA?
- CARBON USAGE WILL BE “FIGURED INTO” OUR CURRENT LIFE CYCLE COST ANALYSIS (for Pavement Type Selection).



CHALLENGES AND OPPORTUNITIES

WHAT DOES THE FUTURE HOLD?

- Historical volatility in the energy sector:
 - Shortages in asphalt cement
 - Shortages in the “B” supply (to make SBS)
 - Shortages in commercial tire supply
 - Shortages in nation’s steel supply
- Natural Gas prices double in one year
- Asphalt cement doubles in less than one year (if you can get it)!



CHALLENGES AND OPPORTUNITIES

WHAT DOES THE FUTURE HOLD?

- Smoke and Smell
- The “Fumes Issue”
- So,
 - How do we reduce our material cost(s)?
 - How do we reduce our dependence on virgin AC and virgin aggregate?
 - How do we make the industry more competitive?
 - How do we make better, long lasting pavements (with better compaction)?



SOLUTION – Warm Mix Asphalt

with RAP – THE WIN-WIN SOLUTION

- WMA - What is it?

Use of either (1) water to foam the AC or (2) chemical additives to help us lower the viscosity of the material. Instead of 280F to 350F HMA we can make 215F to 275F WMA.

A 30 percent reduction in fuel consumption has been reported in Europe!
More environmentally friendly!



SOLUTION – Warm Mix Asphalt with RAP – THE WIN-WIN SOLUTION

- RAP – Recycled Asphalt Pavement

- Value (at AC PG 76.22 @ \$900/ton @ 4.6% and Aggregate at \$30.00 per ton)

\$70.00 per ton

- So,
 - 20% RAP would reduce HMA by \$14.00
 - 30% RAP would reduce HMA by \$21.00
 - 40% RAP would reduce HMA by \$28.00



SOLUTION – Warm Mix Asphalt

with RAP – THE WIN-WIN SOLUTION

- WHY RAP WITH WMA?

- The Double Barrel Green System (a counterflow process) requires that the virgin aggregate be “superheated” prior to the addition of the RAP in the outer drum. Thus, the virgin aggregate will be as dry or drier than with conventional HMA.

- The “superheating” of the virgin aggregates will allow for sufficient baghouse temperatures.



SOLUTION – Warm Mix Asphalt *with RAP – THE WIN-WIN SOLUTION*

- RAP HAS GOTTEN “A BAD RAP”!
- Epps/FHWA – Standard Deviations of RAP
 - No. 8 Sieve = 3 to 5 percent
 - No. 200 Sieve = 0.8 to 1.4 percent
- We’ve found that the existing RAP piles are more consistent than we thought (lower STDEV). They have already been processed, graded and proportioned.



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with RAP – THE WIN-WIN SOLUTION

- HMA MIXTURE EXAMPLE:

- Sized Virgin Aggregate

- 67's or 1" x $\frac{3}{4}$ "
 - 78's or $\frac{3}{4}$ " x $\frac{3}{8}$ "
 - 7's, 8's or 9's or $\frac{3}{8}$ " x No. 4
 - 11's or $\frac{1}{4}$ " x 0 (screenings)
 - Coarse Sand (Concrete or field)
 - Rap 1, 2 or 3 sizes (+ $\frac{3}{4}$ ", $\frac{3}{4}$ " x No. 4 and –No. 4)

All controlled by individual feeder bins w/ MOISTURE CORRECTION compensated for in plant controls!



SOLUTION – Warm Mix Asphalt ***with RAP – THE WIN-WIN SOLUTION***

- RAP HAS GOTTEN “A BAD RAP”!
- Sizing (or fractionizing) RAP will further reduce variability and allow the producer to gain more control and place the material in a position for its best and greatest value!
- Treat RAP just like currently used sized virgin aggregate (two to three RAP bins).



SOLUTION – Warm Mix Asphalt

with RAP – THE WIN-WIN SOLUTION

- WHAT WE NEED FROM RESEARCH:

- Figure out accurate Gsb of RAP.
- Help us establish virgin aggregate standard deviations (for both gradation and moisture).
- Help us establish RAP variations with single and multiple stockpiles and fractions.

THIS WILL ENABLE US TO BUILD OUR CONFIDENCE.



*LET US LEAVE YOU WITH A
PROVOCATIVE THOUGHT:*

“Great idea with sound strategy!
But there is one problem. What is
a MERE contribution for you is a
TOTAL commitment for me!