

# 2014 APAM Conference HMA Update

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# Hot Mix Asphalt (HMA) Update

- Longitudinal Joint Specification
- Witness Samples for HMA Binders
- Reclaimed Asphalt Pavement (RAP)/ Recycled Asphalt Shingles (RAS) Specification
- Additional Items

# Longitudinal Joint 12SP501(Y)

- April - 2012
  - ❖ Joints with same mix and lift on both sides of joint
  - ❖ Incentive for densities over 91.5%
  - ❖ \$1 per foot pay item, reduced for densities below 90.5%
  - ❖ Remove and Replace below 88%, no payment
- June - 2012
  - ❖ All longitudinal joints
- October - 2012
  - ❖ Removed \$1 per foot pay item
  - ❖ Incentive/Disincentive Remain
  - ❖ Other minor changes

# Longitudinal Joint 12SP501(Y)

- October 2013 (November Letting)
  - ❖ Removal Threshold 86% Density
    - ✓ Full lane removal (plus 6" past joint) on top course
    - ✓ 30" patch for lower courses
    - ✓ Added identification of removal limits



# Longitudinal Joint 12SP501(Y)

- Quality Adjustment- 2 Pay Equations

- ❖ 93.5%-88.0% Density

- ✓ Linear pay equations from \$1/foot incentive to -\$0.83/foot negative adjustment (even pay at 90.5% density)

- ❖ 88%-86% Density

- ✓ Linear pay equation from -\$0.83/foot to -\$9.00/foot negative adjustment for top course. Lower courses capped at -\$4.00/foot.

- ❖ Informational table to clarify pay adjustments and action requirements

# Information Table

<b><u>TOP COURSE QUALITY ADJUSTMENT</u></b>			
Density Range	Incentive/Negative Quality Adjustment	Dollar Value	Action Required
90.50% ≥ 93.50%	Incentive	\$0.00/foot - \$1.00/foot (max.) EQ. 1	N/A
88.00% – 90.49%	Negative Quality Adjustment	\$0.83/foot - \$0.00/foot EQ. 1	Stop production if below 89.00%
86.00% - 87.99%	Negative Quality Adjustment	\$9.00/foot - \$0.84/foot EQ. 2	All joints saw or route and sealed
< 86.00%			Full lane width removal plus 6 inches past the longitudinal joint(s)
<b><u>LEVELING AND BASE COURSE QUALITY ADJUSTMENT</u></b>			
Density Range	Incentive/Negative Quality Adjustment	Dollar Value	Action Required
90.50% ≥ 93.50%	Incentive	\$0.00/foot - \$1.00/foot (max.) EQ. 1	N/A
88.00% - 90.49%	Negative Quality Adjustment	\$0.83/foot - \$0.00/foot EQ. 1	Stop production if below 89.00%
86.00% - 87.99%	Negative Quality Adjustment	\$4.00/foot (max.) - \$0.84/foot EQ 2	N/A
< 86.00%			Remove 30 inches centered on the joint with saw cutting with double tack coat of vertical faces.

# Longitudinal Joint 12SP501(Y)

- Other Changes
  - ❖ Joints formed by paving perpendicular or at a skew to mainline excluded (approaches, hand work, gores, etc.)
  - ❖ Clarified language on echelon paving
    - ✓ If called for on the plans, it is not considered a longitudinal joint
    - ✓ If contractor option, considered a longitudinal joint
  - ❖ Staging requirements may affect location of core
  - ❖ Different lift thicknesses- take core 4" off center on cold side

# Longitudinal Joint 12SP501(Y)

Staging Issues

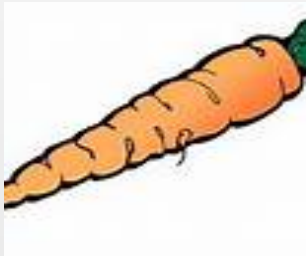


# Longitudinal Joint 12SP501Y

## Density History



- 2009- Informational Average Density 89.8
- 2011- Pilot 90.7 (Carrot, Small Stick)
- 2012- FUSP 91.6 (Bigger Stick (hammer))



vs.



# Witness Samples for HMA Binders

- Partnering with the Federal Highway Administration (FHWA)
- 2013- Goal was to have one witness sample per asphalt binder grade on every project
- 2014- **Requirement** is to have one witness sample per asphalt binder grade on every project
  - Witness samples considered QA samples. Contractor provided daily samples considered QC samples
  - Documentation must be in construction files
  - Increased communication between project office, CFS, and region mix inspectors will be needed

# Witness Samples for HMA Binders

- Timeliness of Testing and Reporting
  - Current practice is to notify offices of failures
  - New practice will be to report passing and failing test results
- Turnaround time for testing
  - Failing tests unpredictable
  - Looking into outsourcing when failures arise
- Timeliness- Encouraging witness samples early in process & timely delivery to Lansing

# Witness Samples for HMA Binders

- One **Sample Per Binder Grade Per Project Per Day**
  - Example 1:
    - 3 mixes, same binder, multiple days paving. One sample per day- applies to all mixes.
  - Example 2:
    - 2 mixes, same binder, paved on separate days. One sample per day, applies to both mixes.

# Sustainability

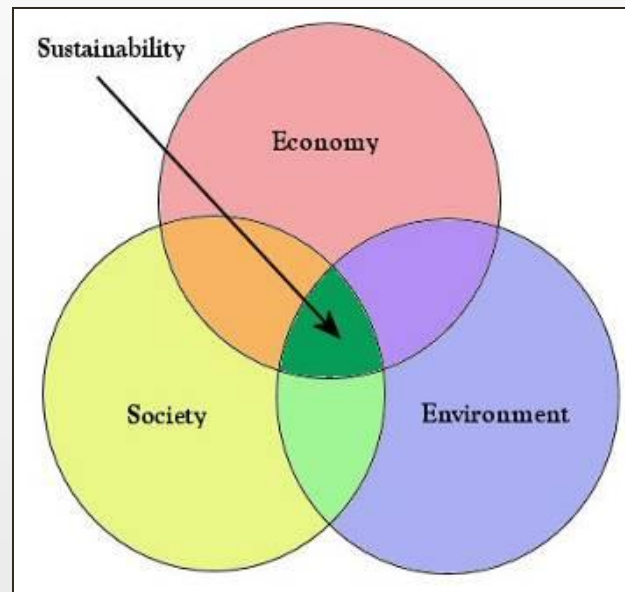
- Sustainability- Meeting the needs of the present without compromising the ability of future generations to meet forthcoming needs

- Triple bottom line:

- ❖ Environmental

- ❖ Social

- ❖ Economic



# Sustainability

- MDOT has historically moved towards permissive use of products where economics and performance dictate usage.
  - ❖ Recycled Asphalt Pavement
  - ❖ Recycled Asphalt Shingles
  - ❖ Warm Mix Asphalt
  - ❖ Recycled Tire Rubber?
- FHWA Recycled Materials Policy
  - ❖ “FHWA has a longstanding position that any material used in highway or bridge construction, be it virgin or recycled, shall not adversely affect the performance, safety or the environment of the highway system. This remains a cornerstone in our policy statement.”

# **Reclaimed Asphalt Pavement (RAP)/ Recycled Asphalt Shingles (RAS) Specification**

- Reclaimed Asphalt Pavement (RAP) Specification - December 2012
- Removed exclusion limiting E3 and higher mixes used as leveling or top course to 17% RAP (changed to 27%)
- Corresponding change to polymer binder specification. No longer limiting RAP to 17% when a polymer binder is specified.

# RAP/RAS Specification

- Recycled Asphalt Shingles (RAS)- April 2013
  - ❖ RAS materials must not contribute more than 17% by weight of the total binder content
  - ❖ Material from manufacturing of asphalt roofing shingles (post-manufacturer RAS) or from tear-off shingles from residential structures (post-consumer RAS)
  - ❖ Stockpile separately
  - ❖ May blend with 20% fine aggregate
    - ✓ Helps avoid clumping and assists in metering from feed bins
    - ✓ Blended RAS and fine aggregate considered final RAS product (not fine aggregate)
  - ❖ 95-100% passing 3/8 inch sieve, 90-100% passing no. 4
  - ❖ Tier 2 and Tier 3 requires blending chart if RAS used
- 2014- Increased testing of Recycled Asphalt Pavement (RAP)

# Why Increased Testing?



# Warm Mix Asphalt (WMA) Specification

- May 2012
  - ❖ Permissive use specification
  - ❖ E10, E3, E1, E03 LVSP
  - ❖ Water Foaming
  - ❖ BOHIM12-09- For projects specifying Superpave Mix Types E30, E50 or GGSP, Construction Field Services (CFS) must be consulted and approve of the change.

# Warm Mix Asphalt (WMA) Specification

- New WMA Specification - April 2013
  - ❖ Allows use on high volume routes (E30, E50 and Gap Graded Superpave)
  - ❖ Allows chemical additives (mirrors Colorado program)
  - ❖ Every Day Counts- Federal Highway Administration (FHWA)

- Qualified Manufacturers List
- Approved Products List Search
- Asphalt Warm Mix**
- Concrete Mix Designs
- Documents
- Administrator Login

Technology Name	Technology Type	Supplier	Approval Date	Re-Eval Date	Contact Name	Contact Phone	Notes/Restrictions
<a href="#">Accu-Shear</a>	Warm Mix Asphalt (Foam)	Stansteel	10/28/13	10/28/16	James Horne	502-867-4210	< 5,000 tons/project
<a href="#">Advera</a>	Warm Mix Asphalt	PQ Corporation	4/14/11	4/14/14	Annette Smith	610-989-0563	
<a href="#">AquaBlack Solutions</a>	Warm Mix Asphalt (Foam)	Maxam	9/19/13	9/19/16	Ron Murphy	800-292-6070	
<a href="#">Cecabase RT 945</a>	Warm Mix Asphalt	Arkema Group	9/2/11	9/2/14	Charlie Atherton	303-888-2245	< 10,000 tons/project
<a href="#">Cecabase RT 945 w/AD-here LOF 65-00</a>	Warm Mix Asphalt	Arkema Group	9/14/12	9/14/15	Charlie Atherton	303-888-2245	< 10,000 tons/project
<a href="#">Evotharm 3G (J1 and M1)</a>	Warm Mix Asphalt	MeadWestvaco	12/8/10	12/8/13	Everett Crews	843-697-5509	
<a href="#">Evotharm DAT (F6 and H5)</a>	Warm Mix Asphalt	MeadWestvaco	12/8/10	12/8/13	Everett Crews	843-697-5509	
<a href="#">Evotharm ET (asphalt emulsion)</a>	Warm Mix Asphalt	MeadWestvaco	12/8/10	12/8/13	Everett Crews	843-697-5509	
<a href="#">Foamed WMA System</a>	Warm Mix Asphalt (Foam)	TEREX	10/12/12	10/12/15	Mark Denison	405-491-2045	< 5,000 tons/project
<a href="#">Green System</a>	Warm Mix Asphalt (Foam)	Astec, Inc	4/14/11	4/14/14	Daniel Edwards	423-240-6379	< 5,000 tons/project
<a href="#">Rediset LQ</a>	Warm Mix Asphalt	AkzoNobel	12/17/13	12/17/16	Sundaram Logaraj	312-544-7046	< 5,000 tons/project
<a href="#">Ultrafoam GX2</a>	Warm Mix Asphalt (Foam)	Gencor Industries	5/27/11	5/27/14	Dennis Hunt	407-970-2600	< 5,000 tons/project
<a href="#">Zycotharm</a>	Warm Mix Asphalt	Zydex	1/22/14	1/22/17	Matt Elam	970-261-5004	< 5,000 tons/project

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Materials & Geotechnical Branch  
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# Recycled Tire Rubber

- Grand Region Pilot Project - 2013
  - ❖ M-57 from East of Northland Drive to West of Morgan Mills Avenue
  - ❖ Crumb rubber portion approximately 3.2 miles on M-57 between Wabasis Road and Morgan Mills
  - ❖ Allowed Wet Process or **Terminal Blend** (contractor's option)
  - ❖ Three binders (64-22, 70-22P, 70-22 crumb rubber modified)
  - ❖ 6007 tons HMA 5E3 Crumb Rubber Modified
  - ❖ Bids
    - ✓ Low Bidder- \$79.45 vs \$85.83
    - ✓ 2<sup>nd</sup> Bidder- \$71.15 vs \$102.97

# Future Challenges

- Funding/Grants (100% Michigan Tires)
- Michigan Department of Environmental Quality (MDEQ) Permit Issue
- Performance

# Funding/Grants

- MDEQ has been providing grants
- Grants have required 100% Michigan Tires
- Violation of federal regulation 635.409 which states, in part:

*“No requirement shall be imposed and no procedure shall be enforced ...  
To require the use of or provide a price differential in favor of articles or  
materials produced within the State.”*

# Michigan Department of Environmental Quality (MDEQ) Permit Issue

- MDOT granted an exemption under Rule 283(l)(a)(vi)
- Exemption based on test/pilot project
- Without exemption stack testing required
- Contractor would not be allowed to produce crumb rubber HMA under existing permit

# MDOT Pilot Project



# Waverly Road



2011 Construction County Road  
(Photo taken in 2013)

# HMA Ultra-Thin Overlay

- Hot Mix Asphalt (HMA) Ultra- Thin Overlay
  - ❖ Working to convert from Marshall Mix to Gyratory Mix
  - ❖ Specification in approval process

Table 1: HMA Ultra-Thin Overlay Mixture Requirements

Parameter	
Air Voids %	4.5
VMA % (min.) based on Gsb	15.5
Fines/Binder % Max.	1.4
N <sub>d</sub>	35

# Local Agency Specifications

- Local Agency
  - ❖ Completing revised Recycled Asphalt Pavement (RAP) specification
  - ❖ Next step completing Frequently Used Special Provisions (FUSP) for Acceptance

# Additional Items/Notes

- Gap-Graded Superpave
  - ❖ New specification better suited for 1.5" applications
  - ❖ For use in alternate bid projects and ?

Standard Sieve, mm	Percent Passing Criteria	
	Lower limit	Upper Limit
1/2 inch	100	-
3/8 inch	70	95
No. 4	30	50
No. 8	20	30
No. 16	-	21
No. 30	-	18
No.50	-	15
No. 100	-	-
No. 200	8	12

# Non-Tracking Bond Coat

2013

- Two pilot projects
- Bond strength tested for non-tracking and standard tack coat
- Need more data information

2014

- Follow 2013 protocol
  - ❖ Formally request
  - ❖ Provide project limits, proposed tack, and manufacturer's specifications
  - ❖ Recommend a control section for comparison
  - ❖ Provide cores for testing

# Additional Items/Notes

- Intelligent Compaction for HMA
  - ❖ Considering a pilot project. Would be part of quality control.
- HMA Production Manual
  - ❖ Revised manual out soon. Reflects current practice.

# Good Government In Action (GGIA)

- Good Government In Action
  - ❖ Adoption of methods to make strategically important changes
  - ❖ Focus on closing performance gaps for anything strategically important
  - ❖ Customer satisfaction is the primary goal
- Hot Mix Asphalt (HMA) Operations Wildly Important Goal (WIG)
  - ❖ 2013 - Focus on dispute resolution turn around time
  - ❖ 2014 – Focus on binder sampling and testing

# Questions?

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