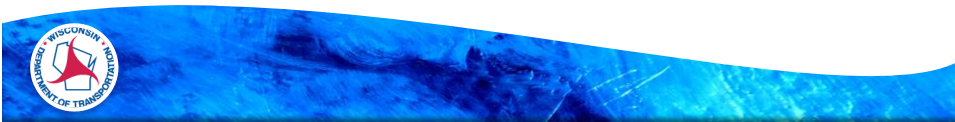


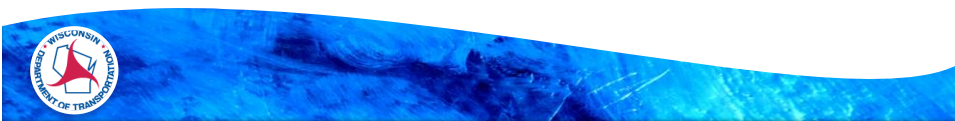
What's New

Session 14



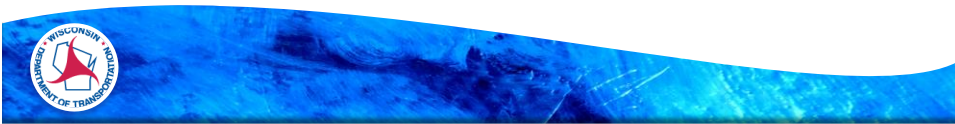
What's happening

- ▶ HMA PWL
- ▶ CIP (Cold-In-Place Recycling)
- ▶ Combined Bid
- ▶ Longitudinal Joint Study
- ▶ Tack Coat Changes
- ▶ High Recycle Pilots
- ▶ Round Robin samples
- ▶ WHRP; Ongoing research
- ▶ Ignition Oven



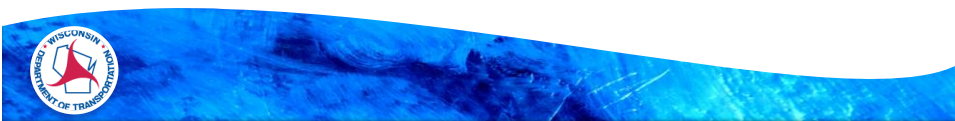
Mix Design Changes

- ▶ 3 yr mix design life
- ▶ E-mix vs. LT, MT, HT
- ▶ More mix design verification
- ▶ FAA, TSR
- ▶ More Aggregate Testing
- ▶ Better tracking of mix specifics



Benefits of **PWL**

- ▶ More discerning than other quality measures
- ▶ Efficiently captures the mean and standard deviation into one measure of quality
- ▶ Encourages Uniformity
 - Controls both the average level and variability of the product in a statistically efficient way
 - Variability is a predictor of performance



What's New?

Current QMP

- ▶ 4 point running average
- ▶ Volumetrics
 - Lot size, currently variable
(600, 900, 1200, 1500, etc)
- ▶ Densities
 - Lot sizes will not change with PWL
- ▶ Nuclear Gauges are not correlated to specific mix

PWL

- Statistically based (Individual tests)
- Volumetrics:
 - Lot size = 3750 ton
 - Sublot size = 750 ton
- Densities
 - Lot sizes will not change with PWL
 - QV tests become more statistically meaningful in new system
- Nuclear Gauges will be correlated to specific mix for each layer (cores)



HMA PWL Pilot Projects

- ▶ Better system for Contractor and Department
- ▶ Requires a Test Strip
 - Core/gauge Correlation
- ▶ For mix testing, split material with the contractor
 - Contractor and Department are testing the same sample



When will it be used?

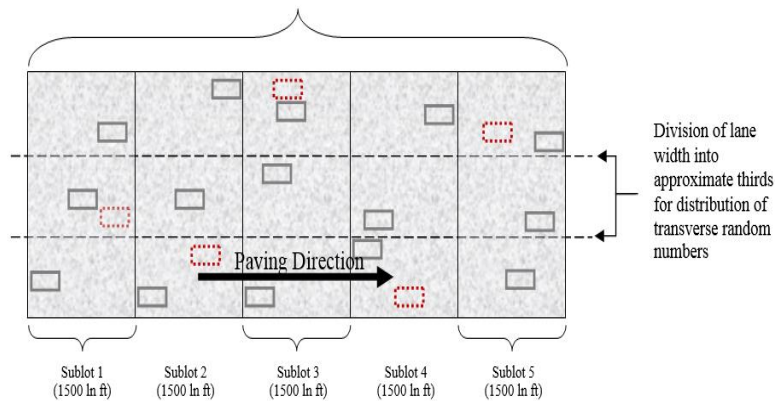
- ▶ Pilot projects in 2016 construction season
 - Goal is 1 pilot project per Region

- ▶ Implementation beginning 2017
 - Will evaluate Pilot Project data
 - Adjustments may be needed before full implementation
 - Round 1: projects with > 11,250 tons per mix type
 - Round 2: lower threshold to use PWL with smaller tonnage projects



Main Production – Density

1 lot (7500 lane ft)



Gmm or Gmb chart

Air Voids										α
Lot	Date	QC Tests	Verification Test	QC Tests	QV Test	Number of QC Tests	Number of QA Tests	Variances Compare?	Means Compare?	0.025
1A	6/01/2014		2.475		2.475					
1B	6/02/2014	2.469		2.469						
1C	6/03/2014	2.477		2.477						
1D	6/04/2014	2.466		2.466						
1E	6/07/2014	2.467		2.467						
2A	6/01/2014	2.464		2.464						
2B	6/02/2014		2.482		2.482					
2C	6/03/2014	2.471		2.471						
2D	6/04/2014	2.473		2.473						
2E	6/07/2014	2.470		2.470						
3A	6/01/2014	2.474		2.474						
3B	6/02/2014	2.469		2.469						
3C	6/03/2014		2.472		2.472					
3D	6/04/2014	2.470		2.470						
3E	6/07/2014	2.476		2.476		12	3	Yes	Yes	
4A	6/01/2014	2.467		2.467						
4B	6/02/2014	2.470		2.470						
4C	6/03/2014	2.468		2.468						
4D	6/04/2014		2.471		2.471					
4E	6/07/2014	2.477		2.477		16	4	Yes	Yes	
5A	6/01/2014	2.468		2.468						
5B	6/02/2014	2.483		2.483						
5C	6/03/2014	2.481		2.481						
5D	6/04/2014		2.479		2.479					
5E	6/07/2014	2.473		2.473		20	5	Yes	Yes	



PWL Air void payment calculated from Gmm & Gmb data

Project1234									
Air Voids									
Lot	Date	Contractor QC Test	Department QV Test	PWL	PF _{AV}	Lot Size (Ton)	Air Voids Pay Adjustment	Use Contractors Test?	
1A	6/1/2014	2.83	2.86						
1B	6/2/2014	2.87							
1C	6/3/2014	3.36							
1D	6/4/2014	4.14							
1E	6/7/2014	4.80		72.93	91.47	3750.00	(\$12,795.00)	Yes	Y
2A	6/8/2014	3.05							
2B	6/9/2014	3.47	2.97						
2C	6/10/2014	3.68							
2D	6/11/2014	3.86							
2E	6/12/2014	3.66		99.89	103.96	3750.00	\$5,940.00	Yes	Y
3A	6/13/2014	3.79							
3B	6/14/2014	3.66							
3C	6/15/2014	4.17	2.30						
3D	6/16/2014	4.20							
3E	6/17/2014	3.82		100.00	104.00	3750.00	\$6,000.00	Yes	Y
4A	6/18/2014	3.55							
4B	6/19/2014	3.43							
4C	6/20/2014	3.60							
4D	6/21/2014	3.69	3.25						
4E	6/22/2014	3.65		100.00	104.00	3750.00	\$6,000.00	Yes	Y
5A	6/23/2014	3.01							
5B	6/24/2014	4.51							
5C	6/25/2014	4.55							
5D	6/26/2014	4.04	2.99						
5E	6/27/2014	3.77		95.38	102.15	3750.00	\$3,225.00	Yes	Y
Total							\$8,370.00		



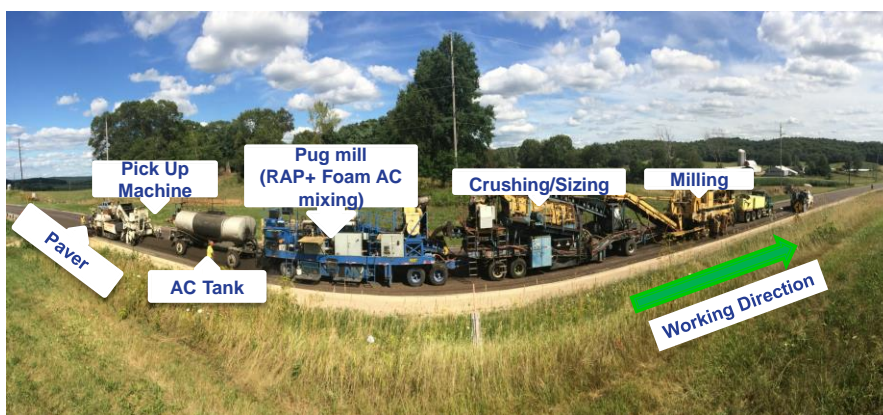
Cold-In Place Recycling (CIR)

- ❑ Mills deteriorated pavement (Typically 3 to 4 inches) to be used as recycled asphalt pavement (RAP)
- ❑ CIR process stays within existing asphalt layer
- ❑ Crushes RAP to the required gradation
- ❑ Mixes with Recycling Agents
- ❑ Re-Paves Recycled Mix
- ❑ Compacts to specified density
- ❑ Readies for surface treatment



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Multi- Unit CIR Train



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Benefit of Cold-In Place Recycling

☐ Economics

- Studies show significant savings per project (compared to equivalent Mill and Overlay)

☐ Reduced construction time

☐ Environment

- Reduction of green house gases

☐ Roadway remains open



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Benefit of Cold-In Place Recycling

- ☐ Effective in rehabilitating distressed pavements with stable bases and subgrades.

- ☐ Using in-place materials minimizes hauling and use of virgin materials.

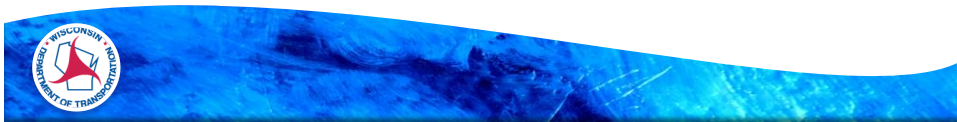
- ☐ Using CIR can improve structural capacity of pavement, allowing for reduction of required overlay thickness.



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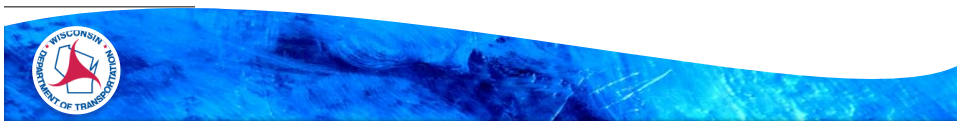
2016 Combining HMA Bid Items

- ▶ When
 - 2017 Standard Specification
 - Available by STSP in February 2016
- ▶ Why
 - Streamline the bidding and estimating processes
 - Aid design/development staff in preparing estimates
 - Simplify the choice of PG Binders for the marketplace



Let's put it all together!

Step 1		Step 2		Step 3	Step 4	
Gradations (Nmas)		Traffic Level		Asphalt Binder	Designation Level	
1	37.5 mm	LT	Low Traffic Vol. (40 gyrations)	58-34	S	Standard
2	25.0 mm	MT	Medium Traffic Vol. (75 gyrations)	58-28	H	Heavy
3	19.0 mm	HT	High Traffic Vol. (100 gyrations)		V	Very Heavy
4	12.5 mm				E	Extremely Heavy
5	9.5 mm					
6	4.75 mm					



- ▶ Questions?
- ▶ Comments?
- ▶ Experiences?

