

2012 Bituminous Conference

# Hamburg Wheel

## Background

- Many  $\Delta$ 's to HMA coming down the Pike
  - RAS
  - Higher levels of RAP
  - Rapidly evolving WMA Technologies & EDC
- IDOT needed a "Proof Test" to ensure Performance
- IDOT decided to embrace the Hamburg Wheel

*"If it Passes Hamburg .... it will Perform"*

## Implementation

- 2010-11 IDOT Purchased 10 Hamburg Wheels
- April 2011 FHWA sponsored Trip for a small group to Learn from Texas



## Implementation

- Adopted Test Criteria Developed by Texas & the AASHTO T324 Test Procedure
  - ½ inch (12.5 mm) Max Rut Depth at Specified Passes

PG Grade	Number of Passes
PG 58-xx (or lower)	10,000
PG 64-xx	10,000
PG 70-xx	15,000
PG 76-xx (or higher)	20,000

## Implementation

- 2011 - Began Specifying HW for High RAP, RAS & WMA Mix Designs
- 2012 – Began Specifying for all new/renewal Mix Designs (i.e. 3 year phase-in).
  - Postponed Specifying for Start-ups until 2013
  - Higher failure rates w/ certain N50's & aggregate sources & some N70's
  - Relaxed Test Pass Criteria

## Implementation

- New Pass Criteria:

PG Grade	Number of Passes
PG 58-xx (or lower)	<del>10,000</del> 5,000
PG 64-xx	<del>10,000</del> 7,500
PG 70-xx	15,000
PG 76-xx (or higher)	20,000

## 2012 Round Robin

- IDOT conducted first HW Round Robin
  - Include all Districts & Private Labs w/ HW
  - BMPR compacted specimens of Plant Produced N105 to proper Void Level
  - Participating Labs trimmed specimens & ran test to specified 20,000 passes for PG76-22
- Results
  - Ave = 4.680 mm
  - Standard Dev = 0.4461 mm
  - Range = 3.87-5.78 mm

## Lessons Learned

- HW identifies Moisture Sensitive Mixtures
- Performance is Largely PG Driven
  - Higher the High Temp. Grade => Lower the Rut
- Higher the Recycle => Lower the Rut Depth
- Mixture Aging Critical
  - Longer Aging => Lower the Rut Depth
  - Important to Follow Specified Aging Requirements

## Lessons Learned

- Higher Test Variability w/ Borderline Mixes
- HW encourages High Recycle & Stiff Mixes which will result in Increased Fatigue & Low Temp Cracking
- Need Companion Test to Identify Mixes that are Too Stiff



## How to Pass Hamburg Wheel

- Try Various Anti-Strips @ Various Rates
  - H.W. identifies Moisture Sensitivity (Stripping)
  - Several A-S Suppliers Provide Free Testing
  - Improvement w/ Lime more dramatic
- Add or Increase Recycle to Max Allowed
  - RAS Especially Helpful due to Fibers & Stiff Binder

## How to Pass Hamburg Wheel

- May Need to Change an Aggregate Source
- Aggregate Hardness & Angularity also has Effect on Performance in H.W.
  - Increase Manufactured Sand

Questions??