4.75 mm Surface

- History of poor friction performance
- Modifications to 4.75 mm mixture to increase macrotexture
  - Fineness modulus $\geq 3.30$
  - Reduced $P_{200}$ from 6.0-12.0 to 3.0-8.0
  - Designed at 5.0% air voids
- Improved Friction by average of 11 FN
4.75 mm Surface

- “Old” spec project
4.75 mm Surface

- “New” spec project
Longitudinal Joints

- 2 step method-based approach
- Hot applied joint adhesive
- Fog seal 1’ on each side of joint
  - Also serves to seal centerline rumble strips
Durability Issues

- Many contributing factors
Tack Coat

- Ongoing Application Problem
Tack Coat

- INDOT Specs state “tack coat shall be uniformly applied”
- Should be easy, right?
- But...
  - Contractors don’t want to do it
  - Agency staff don’t want to enforce it
- Research to determine feasibility of tack performance tests underway
5% Mix Design

- Optimizing Laboratory Mixture Design as it Relates to Field Compaction in order to Improve Hot-Mix Asphalt Durability
  - Design mix at 5% air voids and compact in field to 5% air voids
  - Lower design gyrations (30-50)
  - Improve durability/reduce oxidation
  - Initial results positive
  - 2 field trials done, further study ongoing
## Recycled Materials / Durability

<table>
<thead>
<tr>
<th>Mixture Category</th>
<th>Base and Intermediate</th>
<th>Surface</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Dense Graded</td>
<td>Open Graded</td>
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<tr>
<td>5</td>
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</tbody>
</table>
Recycled Materials / Durability

- Grade bump at 25% BR
- Maximum 25% BR from RAS
- Will modify RAS specs based on PP-78

- But INDOT is not seeing performance issues with RAP or RAS mixtures
Recycled Materials / Durability

- INDOT has an HMA durability problem

- No evidence of a link to amount of RAP / RAS in mixture

- So what’s going on?
15% RAP
35% RAP
Aggregate Gsb

- Previously, INDOT distributed list of aggregate Gsb values
- Contractor was allowed a tolerance from these values
- Significant pattern of Contractor values higher than INDOT values
Aggregate Gsb

“Inflated” Gsb in mix design leads to:

- Overestimated VMA
- Underestimated Pba
- Overall lack of binder
Aggregate Gsb

- INDOT now requires agency-tested Gsb to be used in mix design

- This doesn’t solve everything

- How to get more binder into the mix?
Acceptance Procedures

- The current method isn’t working
- Performance Related Specs?
- How to get Contractor goals in line with Agency goals?
  - Incentive to innovate
  - Or just the incentive to do it right!
Questions?

Matt Beeson, P.E.
Asphalt Engineer
Indiana Department of Transportation

mbeeson@indot.in.gov
317-610-7251 x 216