WE’VE COME A LONG WAY!

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Testing, LLC
Objectives

• Outline 20 Years of HMA Improvements.
• Increase Awareness of HMA Quality.
• Congratulate HMA Industry!
IMPROVED

- Specifications
- Material
- Equipment
- Support
- Labs
- Training
- New Mixtures
Major Milestones

1984 Task Force on Stability and Durability

1990 QC/QA Introduced

1995 Superpave Introduced

RECENT New Mixes & New Technology.
Before 1984

- All mix designs:
  - Central Springfield Lab
  - Chicago District Labs
- Design Voids: 2½%
- Natural Sand
- “Method” Specs
- Interstate Overlays were not working.
STAY IN YOUR LANE
Task Force on Stability and Durability

1984

U of I
IAPA
IDOT
AI
Consultants
FHWA
IAAP
NAPA
Task Force on Stability and Durability

Assignment

1. **Review** Interstate Overlay Policies, Procedures, and Operations.

2. **Recommend** changes to address rutting of Interstate Overlays.
Task Force Recommendations

1. Increase Design Air to 4%.
2. Add VMA Spec.
4. Decentralize Mix Design.
5. Allow Contractor Mix Design.
6. Implement Contractor Quality Control.
Task Force Legacy

Basic Task Force Recommendations:

- Emphasized Stability.
- Defined Class I Mixtures.
- Are still Valid for Superpave.
After 1984

- Districts began to perform mix design and acceptance testing.
- Still, few contractor labs or mix designs.
1990 Quality Initiative Program

3 QC/QA Programs:
- Aggregate Gradation
- Portland Cement Concrete
- Hot Mix Asphalt.
Aggregate QC/QA

AGCS – Aggregate Gradation Control System

• Real-Time Gradation (Quality Control) Tests
• Tighter Gradation Control – Improved consistency.
• Increased Quality Awareness
  • Aggregate Producer
  • HMA Mix Producer.
HMA QC/QA
QC/QA Infrastructure

1. Trained Technicians
2. Qualified QC and QA Labs
3. Uniform Contract Requirements (Special Provisions)
4. Uniform Test Procedures.
Technician Training

• Required for everyone:
  • Contractor
  • IDOT
  • Local Government
  • Consultant

• Developed by IDOT
• Housed at Lake Land College
• Central IL and Chicago area classes.
HMA Trained Technicians

- Aggregate Gradation & AGCS 4,000 graduates
- Level I - Lab and Field Tests 2,400 graduates
- Level II - QA Manager 1,400 graduates
- Level III - Mix Design 600 Graduates
Manual of Test Procedures for Materials

Uniformity:
- Test Procedures
- QC Procedures
- Lab Operations
- Annual Updates.
Qualified Labs

Required for:

- Districts
- Contractors
- Consultants

- Central Office Inspection
- District Re-approval
- Technical Manager
- Calibration Records
- IDOT Round-Robin
Contractor Quality Control

- Contractor Mix Design
- Lab and Field Control Tests
- Control Charts – Corrective Action
- Standard Procedures
  - Nuc-Core Correlations
  - Start-up, Test Strip
Superpave

1. Performance Graded Binders – “PG Binders”
2. Polymer Modified Binders
3. Gyratory Compaction
PERFORMANCE Graded Binder
Polymer Modified Binders

Improve: Stability **and** Durability:

- Stiffness Resists Rutting
- Elasticity Resists Fatigue Cracking
- Ductility Reduces Thermal Cracking
- Adhesion to Aggregate Improves Resistance to Moisture Damage.
IT’S MORE THAN MIX DESIGN

Durability depends on proper placement and compaction!
Improved Density for Long Term Durability
Permeability
Lift Thickness

- Compaction Potential is Related to Lift Thickness...
- And Long Term Performance.
- 3 x NMAS Aggregate Size.
Binder Thickness
- Prior Policy

Surface
1.5 in.

“B” Binder
1.5 in.
Binder Thickness
- 3x NMAS Policy

Surface 1.5 in.

“B” Binder 1.5 in.

Surface 1.5 in.

“B” Binder 2.25 in.

0.75 in.

3 in.
"B" Binder / IL 4.75 Binder

- Surface: 1.5 in.
- "B" Binder: 2.25 in.
- IL 4.75 Binder: 0.75 in.

2.25”
1.5 in.
It will still be a good idea when your grandchildren get to be your age.

Designs for asphalt pavement have evolved so that you can expect to get a lifetime of smooth performance while reducing costs and improving safety. Here's how:

The Perpetual Pavement technology involves the use of multiple layers of durable, recyclable asphalt. When the surface layer needs maintenance, it can be quickly and easily milled off and replaced without disturbing the rest of the roadway's structure. And, many decades from now, the pavement structure will still be intact.

For more information, and for a free interactive CD discussing the Perpetual Pavement concept and research, visit www.AsphaltAlliance.com or call toll-free 877-272-0077.
Three Layer Design

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMA, OGFC or Superpave</td>
<td><strong>Intermediate Layer</strong></td>
</tr>
<tr>
<td>Aggregate, Lime Modified, or..</td>
<td><strong>Fatigue Layer</strong></td>
</tr>
</tbody>
</table>
Rubbblization Option
Hydrated Lime Anti-strip
Smoothness
End Result Specifications

- Since 2000
- 34 Projects
- 14 Contractors
- Pay Factors
  - AC %
  - Density
  - Voids

- \( \sigma = 0.18\% \)
- LSL
- USL
- 61 PWL
- JMF
- 0.25%
Lab Equipment
Superpave Gyratory Compactor
Binder Ignition Oven

- Fast Test Results
  - Gradation
  - AC %
- Safe
- Accurate.
Improved RAP Quality

QC Program
• Gradation
• AC Content
• Source i.d.
• Sort by “Quality”
New Technology
New Mixtures

4.75 mm
Binder

SMA
Binder
SMA – Stone Matrix Asphalt

SMA   N_{50} Surface
IL Low ESAL Superpave Mixes

9.5 Low ESAL

$N_{50}$ Surface
IL 4.75 Binder/Level Binder

IL 4.75 mm  

$N_{50}$ Surface
for Local Agencies

- Low Volume Mix Specifications
- State support for QC/QA program
- Special QC/QA Training Classes
- Special Superpave Training Classes
Summary

- Better Material
  - Aggregate
  - PG Binder
- Better Equipment and Plants
- Smarter Personnel
- More Dependable Test Results
- More Mix Options
- Commitment to Quality

= Better HMA Mixes
Thank You!