Specifications Impact from Contractors
Point of View

55th Illinois Bituminous Paving
& North Central Asphalt Conference
February 2-3, 2015

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Howell Asphalt Co.
Specifications Impact from Contractors
Point of View

• Method Specifications
• QCQA
• ERS
• PFP
• QCP
• QMP
• Method Specification (1930)
  – Lab Requirements
    • 10’ x 12’ x 7’ (144 ft$^2$)
    • 2 – Windows & Workbench with drawers
    • Be able to see Mixing Platform
  – Mix Designs
    • Submitted 1 pound of Asphalt
    • Submit %’s of Ingredients
  – Proportioning at Plant
    • IDOT
  – Density on Road
    • IDOT
    • Cores 90% of “D”
      – R&R if out of Specification
• Method Specification (1990)
  – Lab Requirements
    • 200 ft$^2$
  – Mix Designs
    • IDOT
    • Contractor Option
  – Proportioning @ Plant
    • IDOT
  – Density on Road
    • IDOT
    • None < 91.0 %
• QCQA (1990’s)
  – Mix Designs
    • IDOT
    • Contractor
  – Proportioning @ Plant
    • Contractor
  – Density on Road
    • Contractor
    • None < 91.0 %
• Responsibility

— Up until the early 90’s IDOT was responsible for
  • Design’s
  • Proportioning @ Plant
  • Density

— QCQA Contractor took responsibility for
  • Design’s
  • Proportioning @ Plant
  • Density
• Contactor Designs
  – Marshall Method (6-14)
    – Type I, II, & III
    – Mixture A & B Binders
    – Mixture C, D, & E Surface
    – Other, BAM
      » Voids
      » VMA
      » Stability
      » Flow
Contactor Designs

– Superpave (12-40)
  • 2 % @ 30 Gyrations
  • @ 4% Voids
    –30
    –50
    –70
    –80
    –90
    –105
Contactor Designs

- 9.5L Surface / 19.0L Binder
- 4.75 Surface / 9.5 Fine Graded
- 9.5 “C” “D” “E” “F” Surface
- 12.5 “C” “D” “E” “F” Surface
- 12.5 Binder
- 19.0 Coarse Graded Binder
- 19.0 Fine Graded Binder
- 25.0 Coarse Graded Binders
- SMA
# Contactor Designs

<table>
<thead>
<tr>
<th>HMA Mixtures $^1, 2/$</th>
<th>FRAP/RAS Maximum ABR %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ndesign</strong></td>
<td><strong>Binder/Leveling Binder</strong></td>
</tr>
<tr>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>90</td>
<td>40</td>
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</table>
Contactor Designs

- Different Aggregates
  - Limestone
  - Dolomite
  - Gravel
  - Trap Rock
  - Slag (Air Cooled / Steel)
  - Sand Stone
  - Concrete

- Different Sources

- Different Asphalt Grades
Contactor Designs

- Virgin Designs
- Recycle Designs
- Asphalt Grades
- RAS

37  74  92  110
Contractor Designs

Hamburg

Rutting Potential

SCB (Semi-Circular Bend)

Cracking (Brittleness Test)
Contractor Designs

Additional criteria

Lengthens Design Process

1-Week

2-Weeks...
QCQA

Voids
  2 per Day for 2 days then 1 per Day
Asphalt Content
  1 per 1/2 Day
Density
  5 Nuc Test across the Mat every ½ Mile
Pay – 100 %
ERS

Voids

800 tons

Asphalt Content

800 tons

Density

5 Cores across the Mat every ½ Mile

Pay – 105 %
PFP

Voids
1000 tons

VMA
1000 tons

Density
1 Core Randomly every 0.2 Mile

Pay – 103 %
QCP

Voids
Varies tons

VMA
Varies tons

Density
1 Core Randomly every 0.2 Mile

Pay – 100 %
Pay Calculations

QCQA - 100%

ERS  30% Voids – 30% AC Content – 40% Density

PFP  30% Voids – 30% VMA – 40% Density

QCP  30% Voids – 30% VMA – 40% Density
Art. 1030.05 (f) Acceptance by the Engineer. Final acceptance will be based on the following.

(1) Validation of the Contractor’s quality control by the assurance process.

(2) The Contractor’s process control charts and actions.

(3) Department assurance tests for voids and density.

If any of the above is not met, the work will be considered in non-conformance with the contract.
Acceptance by the Engineer. All of the Department’s tests shall be within the acceptable limits listed below:

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<th>Acceptable Range</th>
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<td>-1.0 – +3.0 %(^1)</td>
</tr>
<tr>
<td>Voids</td>
<td>2.0 – 6.0 %</td>
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<tr>
<td>Density:</td>
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<td>IL-19.0, IL-25.0, IL-9.5</td>
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<td>IL-4.75, SMA</td>
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<tr>
<td>Dust / AC Ratio</td>
<td>0.4 – 1.6(^2)</td>
</tr>
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\(^1\) Based on minimum required VMA from mix design

\(^2\) Does not apply to SMA

In addition, the PWL for any quality characteristic shall be 50 percent or above for any lot. No visible pavement distress shall be present such as, but not limited to, segregation, excessive coarse aggregate fracturing or flushing.
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Designs / Production / Voids
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Contactor Designs / Production
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Out of Spec Material

– Take into account location
  • Base Conditions
  • Location of Material in Pavement structure
– Narrow down Out of Spec Material
– Only remove what is necessary
– Accept Credit
Out of Spec Material

- HMA Surface Cse N70 “C” - $80
- Remove - $15 - 20,000
- Replace - $60 - 70,000
- R&R - $75 – 90,000
Contactor Production

- Production of HMA is a High Volume Process
  - Taking Aggregates at a High Rate
    - 150 – 500 tph
    - Acceptable variance of Master Bands within AGCS ± 8
    - Relates to ± 4 on PCS
    - 4% Δ PCS ≈ 0.6 to 2% Δ Voids & VMA
Contactor Quality Control & Production

• Additional Equipment & Controls on Plants
• Additional Materials at Plants
• Additional Testing Equipment
• Additional Personnel

• All Adds cost
Contactor Quality Control & Production

Future:

Fewer Design
Better Control
Better Quality
Less Risk
Lower Cost
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Thank You for Your Time