Asphalt BINDER Performance Grade Table

Section 7 – Mix Design

Variables and Effects

Mix Design Variables and Their Effects

- **Variables**
  - **Aggregates**
  - **Asphalts**
  - **Density**

Aggregates

- **Gradation**
- **VMA**
- **Crushed Faces**

Gradation

- 0.45 Power Chart
  - Max. Nominal Size
  - Max. Size
  - Max. Density Line

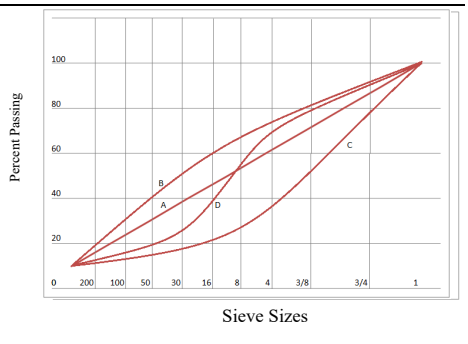
Section 7 - 4

Gradation (continued)

- Interpreting 0.45 Chart
  - Dense Gradation
  - Coarse Gradation
  - Fine Gradation
  - Gap Gradation (limestone mixes)
  - VMA vs. Gradation
  - Excess Fines

Section 7 - 5

Gradation



Section 7 - 6

VMA

- vs. Gradation
- vs. Crushed Faces
- vs. Angularity
- vs. Absorption
- vs. Asphalt Content

Section 7 - 7

Crushed Faces

- Vs. Stability/Durability
- Minimum requirements
  - Table 803.5.5-2

Section 7 - 8

Summary

Coarse Gradation +
High VMA +
High Crushed Faces =

Better Pavement

Section 7 - 9

Adverse Effects

- Coarse Gradation
  - Decreased Workability
  - Decreased Compactibility
  - Segregation
  - Raveling
- High VMA
  - Special Attention to AC Content
  - Sensitivity to AC Content
- High Crushed Faces
  - Decreased Workability
  - Decreased Compatibility

Asphalt

- Asphalt Content
- Temperature / Viscosity

Asphalt Content

- Vs. Gradation
- Total vs. Effective
- Excessive / Insufficient

Excess Asphalt

- Flushing / Bleeding
- Tenderness
- Low Skid Resistance
- Rutting / Shoving
- Shearing When Hot

Insufficient Asphalt

- Inadequate Coating
- Low Film Thickness
- Difficult Compaction
- Raveling
- Stripping
- Segregation
- Shearing When Cool

Section 7 - 13

Temp. / Visc.

- Mixing Temperature – high enough to coat without draindown
- Compaction Temperature – high enough for workability without bleeding

Section 7 - 14

High Temp.

- Blue Smoke
- Drain Down
- Fat Spots
- Low Film Thickness
- Non-Uniform Density

Section 7 - 15

Low Temp.

- Poor Coating / Mixing
- Poor Workability
- Difficult Compaction
- Checking / Shearing
- Raveling

Section 7 - 16

Density

- Proper density – 92% to 97% of Voidless
- WYDOT – Q A Spec.
- Low Density
  - High Air Voids
  - Low Stability
  - Rapid Aging
  - Poor Moisture Resistance
  - Poor Fatigue Resistance
  - Rutting / Shoving

Section 7 - 17

Density (continued)

- High Density
  - Flushing / Bleeding
  - Poor Skid Resistance
  - Poor Flexibility

Section 7 - 18