Aggregate Testing
Recertification

Quality Control / Quality Assurance
DOT Employee Timesheet Information

Charge to Office Overhead

AFE- 71B4

Function- 1174
**IMPORTANT**

Recertification is only for individuals currently certified and actively participating on Asphalt Concrete Projects (must attend certification class every 8 years)
Course Materials

- QC/QA Asphalt Concrete Training Manual
- Standard Specifications for Roads and Bridges (2015 Edition) - Sections 320 and 322
- South Dakota DOT Materials Manual - Minimum Sample and Test Requirements (MSTR)
- Example Problems Packet
- Materials located at sddot.com/resources/manuals
Course Agenda

- Manufactured Fines
- Plastic Limit, Liquid Limit and Plasticity Index
- Sampling and Splitting
- Gradation
- Sand Equivalent
- Fine Aggregate Angularity
- Specifications
- Issues
- Recertification Exam
Asphalt Concrete Production Control

• Preconstruction meeting by Contractor
• Line of authority shown for both QC and QA personnel
• Certified testing personnel
• Calibrated test equipment
• Quality Control plan
• Plans, current SDDOT Manuals Manual, supplemental specifications and errata
Certification Requirements

• Testers must be QC/QA certified in SD and have proof of certification
• Testing equipment calibration records shall be available on National Highway System Projects
• Requirements on www.sddot.com
Certified Technicians

- The certified technicians must be present at the plant and roadway whenever the plant is supplying asphalt concrete to the roadway.
Laboratory Requirements

• Lab at plant site, Type III lab required for DOT personnel as of January 2005
• Ovens, power, etc.
• Calibration records in QC lab
  – All major equipment used for testing
  – Internal angle on gyratory compactor
Mix Design Report

- Approved Mix Design Report from Central Materials Lab
- Posted in field labs
- Mix compaction temperatures
- Job Mix Formula
- Gyratory, Rice, & other Mix Design results
- Manufactured Fines %
- Aggregate Composite % \( \text{H}_2\text{O} \) at SSD if lime is added * must be 1.0% above SSD content or add additional \( \text{H}_2\text{O} \) at pug mill
Manufactured Fines

- **Definition:** fine aggregate produced by crushing rock or gravel.

- **Specification**

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Class D</th>
<th>Class E</th>
<th>Class G</th>
<th>Class S</th>
</tr>
</thead>
<tbody>
<tr>
<td>#4 Manufactured Fines*</td>
<td>NA</td>
<td>20% Min.</td>
<td>70% Min.</td>
<td>95% Min.</td>
</tr>
</tbody>
</table>

*Manufactured fines shall be manufactured solely from material retained on the ¾ inch sieve, unless the aggregate material is produced from a ledge rock source.

- **What to do if it fails?**
  - Change Bin Splits

- **Problem #1** (Problem Packet – Pages 1 & 2)
Problem #1
Manufactured Fines

1. Using the Mix Design Report (below & Page 1 in the Problems Packet) and the Manufactured Fines worksheet (Page 2 in the Problems Packet), calculate the amount of manufactured fines.

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Asphalt Concrete Surfacing</th>
<th>Class</th>
<th>E1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Contractor</td>
<td></td>
<td>Nominal Agg. Size</td>
<td>12.5 mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRADATION OF MINERAL AGGREGATE USED FOR TRIAL MIXTURES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Accumulative Percentages Passing)</td>
<td></td>
</tr>
<tr>
<td>Mn.Fns &gt; yes yes no yes yes</td>
<td></td>
</tr>
<tr>
<td>% AGGR = 17 11 61 11</td>
<td></td>
</tr>
<tr>
<td>Sieve</td>
<td>Milbank Rk</td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>1 IN.</td>
<td>100.0</td>
</tr>
<tr>
<td>3/4 IN.</td>
<td>100.0</td>
</tr>
<tr>
<td>5/8 IN.</td>
<td>92.0</td>
</tr>
<tr>
<td>1/2 IN.</td>
<td>59.0</td>
</tr>
<tr>
<td>3/8 IN.</td>
<td>24.0</td>
</tr>
<tr>
<td>#4</td>
<td>3.0</td>
</tr>
<tr>
<td>#8</td>
<td>2.0</td>
</tr>
<tr>
<td>#16</td>
<td>1.5</td>
</tr>
<tr>
<td>#40</td>
<td>1.0</td>
</tr>
<tr>
<td># 200</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Problem #1 - Answer

% Manufactured Fines Calculations

<table>
<thead>
<tr>
<th>% Bin Splits</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Passing #4</td>
<td>3.0</td>
<td>30.0</td>
<td>87.0</td>
<td>100.0</td>
</tr>
<tr>
<td>% Crushed - #4</td>
<td>100 (yes)</td>
<td>100 (yes)</td>
<td>0 (no)</td>
<td>100 (yes)</td>
</tr>
</tbody>
</table>

- Fill Out the Table using the Mix Design Report

- If Manufactured Fines is yes, (c) = 100
- If Manufactured Fines is no, (c) = 0

- Plug numbers into the equations (next slide)
Problem #1 – Answer (cont.)

- Calculate the composite % passing #4

\[
\left( \frac{a_1}{100} \times b_1 \right) + \left( \frac{a_2}{100} \times b_2 \right) + \left( \frac{a_3}{100} \times b_3 \right) + \left( \frac{a_4}{100} \times b_4 \right) = D
\]

- \[
\left( \frac{17}{100} \times 3.0 \right) + \left( \frac{11}{100} \times 30.0 \right) + \left( \frac{61}{100} \times 87.0 \right) + \left( \frac{11}{100} \times 100.0 \right) = 67.9
\]

- Next, calculate the % of total -#4 from each stockpile (next slide)
Problem #1 – Answer (cont.)

• Calculate the % of total -#4 from each stockpile

<table>
<thead>
<tr>
<th>Stockpile Product =&gt;</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Bin Splits</td>
<td>(a)</td>
<td>17</td>
<td>11</td>
<td>61</td>
</tr>
<tr>
<td>% Passing #4</td>
<td>(b)</td>
<td>3.0</td>
<td>30.0</td>
<td>87.0</td>
</tr>
<tr>
<td>% Crushed - #4</td>
<td>(c)</td>
<td>100 (yes)</td>
<td>100 (yes)</td>
<td>0 (no)</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
\text{Stockpile #1:} & \quad \frac{a_1 \times \left(\frac{b_1}{100}\right)}{D} \times c_1 = x_1 = \frac{17 \times \frac{3.0}{100}}{67.9} \times 100 = 0.75 \\
\text{Stockpile #2:} & \quad \frac{a_2 \times \left(\frac{b_2}{100}\right)}{D} \times c_2 = x_2 = \frac{11 \times \frac{30.0}{100}}{67.9} \times 100 = 4.86 \\
\text{Stockpile #3:} & \quad \frac{a_3 \times \left(\frac{b_3}{100}\right)}{D} \times c_3 = x_3 = \frac{61 \times \frac{87.0}{100}}{67.9} \times 0 = 0 \\
\text{Stockpile #4:} & \quad \frac{a_4 \times \left(\frac{b_4}{100}\right)}{D} \times c_4 = x_4 = \frac{11 \times \frac{100}{100}}{67.9} \times 100 = 16.20
\end{align*}
\]

• Then add all together \[ 0.75 + 4.86 + 0 + 16.20 = 21.8 \rightarrow 22\% \]
PL, LL and PI (SD 207)

• Plastic Limit, Liquid Limit and Plasticity Index
• On Class D, E, G, HR and S mixes
• Specification in Standard Specifications for Roads and Bridges
• Problem #2  (Problem Packet: Page 3)
Problem #2
PL, LL and PI

Class E1, Calculate the L.L. and P.I. What are the specs?

<table>
<thead>
<tr>
<th>Liquid Limit</th>
<th>L.L.</th>
<th>P.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. can number</td>
<td>9a</td>
<td>10a</td>
</tr>
<tr>
<td>b. wt. can + wet soil</td>
<td>39.13</td>
<td>34.92</td>
</tr>
<tr>
<td>c. wt. can + dry soil</td>
<td>34.32</td>
<td>31.32</td>
</tr>
<tr>
<td>d. wt. of water (b - c)</td>
<td>(.01g)</td>
<td></td>
</tr>
<tr>
<td>e. wt. of can</td>
<td>(.01g)</td>
<td></td>
</tr>
<tr>
<td>f. wt. of dry soil (c - e)</td>
<td>(.01g)</td>
<td></td>
</tr>
<tr>
<td>g. Liquid Limit (d/f x j x 100)</td>
<td>(0.1)</td>
<td>N.A.</td>
</tr>
<tr>
<td>h. Plastic Limit (d/f x 100)</td>
<td>(0.1)</td>
<td>N.A.</td>
</tr>
<tr>
<td>i. P. I. (g - h)</td>
<td>(0.1)</td>
<td></td>
</tr>
</tbody>
</table>

Liquid Limit N.C. (g. rounded) (i. rounded)

Plasticity Index N.A.

j. corr # blows 26 22 = 0.9846 23 = 0.9899 24 = 0.9952
25 = 1.0000 26 = 1.0050 27 = 1.0100 28 = 1.0138

wt. - #40 105.0 / wt. - #4 324.5 x % pass. #4 = 22.2
(± 3.0% VARIABLE of % pass. (0.1%) on the #40)

SPECIFICATION L.L.
SPECIFICATION P.I.
Problem #2 - Answer

PL, LL and PI

- **L.L.**
  - d) wt. of water = 39.13 − 34.32 = 4.81 g
- **P.L.**
  - d) wt. of water = 34.92 − 31.32 = 3.60 g
- **L.L.**
  - f) wt. of dry soil = 34.32 − 15.02 = 19.30 g
- **P.L.**
  - f) wt. of dry soil = 31.32 − 13.03 = 18.29 g
- **g)** Liquid Limit = \( \left( \frac{4.81 \text{ g}}{19.30 \text{ g}} \right) \times 1.0050 \times 100 = 25.0 \text{ rounded} \rightarrow 25 \)
- **h)** Plastic Limit = \( \left( \frac{3.60 \text{ g}}{18.29 \text{ g}} \right) \times 100 = 19.7 \)
- **i)** P. I. = 25.0 − 19.7 = 5.3 rounded \rightarrow 5

- **Specifications**
  - Spec. Book Sect. 880 (Class E1)
    - L.L. (max) = 25
    - P.I. (max) = Non-Plastic
## Problem #2 - Answer

**PL, LL and PI**

### Class E1

<table>
<thead>
<tr>
<th>Component</th>
<th>L.L.</th>
<th>P.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9a</td>
<td>39.13</td>
<td>34.92</td>
</tr>
<tr>
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<td>34.32</td>
<td>31.32</td>
</tr>
<tr>
<td>c. wt. can + dry soil</td>
<td>4.81</td>
<td>3.60</td>
</tr>
<tr>
<td>d. wt. of water (b - c)</td>
<td>19.30</td>
<td>18.29</td>
</tr>
<tr>
<td>e. wt. of can</td>
<td>15.02</td>
<td>13.03</td>
</tr>
<tr>
<td>f. wt. of dry soil (c - e)</td>
<td>19.30</td>
<td>18.29</td>
</tr>
<tr>
<td>g. Liquid Limit (d/f x j x 100)</td>
<td>25.0</td>
<td>N.A.</td>
</tr>
<tr>
<td>h. Plastic Limit (d/f x 100)</td>
<td>N.A.</td>
<td>19.7</td>
</tr>
<tr>
<td>I. P. I. (g - h)</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>Liquid Limit N.C. (g. rounded)</td>
<td>25</td>
<td>N.A.</td>
</tr>
<tr>
<td>Plasticity Index</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>j. corr # blows</td>
<td>26</td>
<td>22 = 0.9846</td>
</tr>
<tr>
<td></td>
<td>23 = 0.9899</td>
<td>24 = 0.9952</td>
</tr>
<tr>
<td></td>
<td>25 = 1.0000</td>
<td>26 = 1.0050</td>
</tr>
<tr>
<td>wt. - #40</td>
<td>105.0</td>
<td></td>
</tr>
<tr>
<td>wt. - #4</td>
<td>324.5</td>
<td></td>
</tr>
<tr>
<td>x % pass. #4 =</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td>(± 3.0% VARIABLE of % pass. (0.1%) on the #40)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Specification L.L.         | 25, max |
| Specification P.I.         | NP      |
Mix Design Report - Gyratory

- Approved Mix Design Report
- Posted in both QC and QA lab
- Mix compaction temperatures
- Job Mix Formula
- Gyratory, Rice, & other Mix Design results
- Aggregate moisture content at SSD
- Aggregate Composite Gsb, aggr. comp. -#4 Gsb
- Aggregate Composite % H₂O at SSD
Aggregate Cold Feed Sample

- Calibration test on cold feed sample ran by QC and QA testers
- Sample obtained from cold feed belt (SD 201)
- Belt or stream sampling. Most use stream sampling, (SD 201 Sec. B) sampling device
- Sample size (Gyratory*), Enough to have 4 splits (6 if IA sample required) large enough to do all required tests
- Split down to testing size using (SD 213), free flowing for splitter
- Dry sample before testing (SD 217)
- Frequency of needed tests, gradation and other applicable tests every 1000 tons QC, minimum 1 per 5000 tons QA, IA one per 15000 tons
- Sample retention time for (Gyratory*) samples is how long?
  - QC until IA and QA tests completed and Engineer approves disposal
  - QA until the Bituminous Engineer has completed the F-test and t-test statistical evaluation
Splitting Procedure

- Read Procedure in SD 213

Diagram:
- Mix and blend sample 3 times using splitter before reducing to testing size.
- Reverse a & b pans.
- Reduce further if more samples are needed.
- S1 (Testing Samples) or S2 (Backup Samples).
Gradation (SD 202)

- **Nominal Maximum Size:** the smallest sieve opening, through which 90% or more of the sample being tested will pass.
- Bin splits shown
- Moisture Percentage
- Dust test, combined - # 200 on DOT 3
- + #4 and - # 4 gradation check
- Adequacy of sieving
  - Not more than 0.5% by weight of the original dry sample weight on a sieve shall pass that sieve in one minute of hand sieving.
- Check for overloaded sieves
  - Chart in SD 202
- JMF specification compliance
- Manufactured Fines requirements
- Problem #3
Problem #3
Total Combined - #200

Calculate the total combined - # 200

- The coarse sieve analysis had 70.7% passing the #4 sieve.
- The washed coarse aggregate sample had 0.64 % passing the #200 sieve.
- 5.01% passed the #200 sieve on the fine sieve analysis.

\[
\begin{align*}
\text{Coarse} & \times \% \text{ Retained/Design} = \\
\text{Fine} & \times \% \text{ Passing/Design} = \\
\text{Total Combined - #200} & =
\end{align*}
\]
Problem #3 - Answer

Total Combined - #200

Calculate the total combined - #200

- The coarse sieve analysis had 70.7% passing the #4 sieve.
- The washed coarse aggregate sample had 0.64 % passing the #200 sieve.
- 5.01% passed the #200 sieve on the fine sieve analysis.
- \[
\% \text{ Retained/Design} = 100 - \% \text{ Passing(Design)} = 100 - 70.7 = 29.3 \%
\]

\[
\frac{0.64 \times 29.3}{100} = 0.19
\]

\[
\frac{5.01 \times 70.7}{100} = 3.54
\]

0.19 + 3.54 = 3.73 or 3.7 %
Sand Equivalent (SD 221)

• Reference AASHTO T 176
• Stock solution is good for how long?
  – Working solution more than 30 days old shall be discarded
• Obtain sample from moistened material which a cast can be formed without free water
• Dry before testing
• Problem #4
Problem #4
Sand Equivalent

Class Q3, Calculate Sand Equivalent. What is the spec?

<table>
<thead>
<tr>
<th>Sand Equiv Test</th>
<th>Sand Rdg.</th>
<th>Clay Rdg.</th>
<th>S. E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading #1</td>
<td>3.2</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>Reading #2</td>
<td>3.2</td>
<td>4.5</td>
<td></td>
</tr>
</tbody>
</table>

Sand Equivalent Test Results
Problem #4 - Answer

Sand Equivalent

Class Q3

<table>
<thead>
<tr>
<th>Sand Equiv Test</th>
<th>Sand Rdg.</th>
<th>Clay Rdg.</th>
<th>S. E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading #1</td>
<td>3.2</td>
<td>4.4</td>
<td>73</td>
</tr>
<tr>
<td>Reading #2</td>
<td>3.2</td>
<td>4.5</td>
<td>72</td>
</tr>
</tbody>
</table>

Sand Equivalent Test Results

\[
\text{S. E.} = \left( \frac{\text{Sand Rdg. #1}}{\text{Clay Rdg. #1}} \right) \times 100 = \left( \frac{3.2}{4.4} \right) \times 100 = 72.7 \text{ (* always round up)} = 73
\]

\[
\text{S. E.} = \left( \frac{\text{Sand Rdg. #2}}{\text{Clay Rdg. #2}} \right) \times 100 = \left( \frac{3.2}{4.5} \right) \times 100 = 71.1 \text{ (*always round up)} = 72
\]

Average the Results

Specification: Spec. Book Sect. 322 (Class Q3)
Fine Aggregate Angularity (SD 217)

- Reference AASHTO T 304
- Calibrated cylinder
- Sample obtained from material retained on #16, #30, #50 and #100 sieve sizes

<table>
<thead>
<tr>
<th>Sieve</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>#16</td>
<td>44 grams</td>
</tr>
<tr>
<td>#30</td>
<td>57 grams</td>
</tr>
<tr>
<td>#50</td>
<td>72 grams</td>
</tr>
<tr>
<td>#100</td>
<td>17 grams</td>
</tr>
<tr>
<td>Total</td>
<td>190 grams</td>
</tr>
</tbody>
</table>

The tolerance for the sample is ±0.2 grams per sieve.

- What to do if it fails?
  - Cease operations, take corrective action and get a passing sample
- Problem #5
Problem #5
Fine Aggregate Angularity

Class Q2R, Fill in the blanks and Calculate FAA. What is the spec?

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>1st trial</th>
<th>2nd trial</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry -#4 bulk specific gravity (Gsb)</td>
<td>2.591</td>
<td>2.591</td>
<td></td>
</tr>
<tr>
<td>Volume of cylinder, mL (V)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of cylinder, g (A)</td>
<td>247.5</td>
<td>247.5</td>
<td></td>
</tr>
<tr>
<td>Wt. of cylinder + aggregate, g (B)</td>
<td>399.3</td>
<td>399.4</td>
<td></td>
</tr>
<tr>
<td>Wt. of aggregate, g (F = B - A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncompacted voids, (nearest 0.1%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U = ((V - (F / Gsb)) / V) * 100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fine Aggregate Angularity**

SD 217
Method A

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Density of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°F</td>
<td>0°C</td>
</tr>
<tr>
<td>60</td>
<td>15.6</td>
</tr>
<tr>
<td>65</td>
<td>18.3</td>
</tr>
<tr>
<td>70</td>
<td>21.1</td>
</tr>
<tr>
<td>75</td>
<td>23.9</td>
</tr>
<tr>
<td>80</td>
<td>26.7</td>
</tr>
<tr>
<td>85</td>
<td>29.4</td>
</tr>
</tbody>
</table>

**Formula:**

\[
U = \left( \frac{V - \left( \frac{F}{G_{sb}} \right)}{V} \right) \times 100
\]

**From Job Mix Formula:**

Aggr -#4 Gsb
Problem #5 - Answer
Fine Aggregate Angularity

- **M** (net mass of water) = 385.6 − 284.8 = **100.8**
- **V** (volume of cylinder, mL) = 1000 × \(\frac{M}{D}\) = 1000 × \(\frac{100.8}{997.97}\) = **101.0**
- **F₁** (wt. of aggregate, g) = 399.3 − 247.5 = **151.8**
- **F₂** (wt. of aggregate, g) = 399.4 − 247.5 = **151.9**

- **U₁** (uncompacted voids) = \(\frac{V - \left(\frac{F}{Gsb}\right)}{V}\) × 100 = \(\frac{101.0 - \left(\frac{151.8}{2.591}\right)}{101.0}\) × 100 = **42.0**
- **U₂** (uncompacted voids) = \(\frac{V - \left(\frac{F}{Gsb}\right)}{V}\) × 100 = \(\frac{101.0 - \left(\frac{151.9}{2.591}\right)}{101.0}\) × 100 = **42.0**

- **Specification**
  - Spec. Book Sect. 322 (Class Q2R)
    - Minimum 41.5 %
Problem #5 - Answer

Fine Aggregate Angularity

Class Q2R  Spec: Min. 41.5%

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>1st trial</th>
<th>2nd trial</th>
</tr>
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<tbody>
<tr>
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<td>Volume of cylinder, mL (V)</td>
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<td>247.5</td>
<td>247.5</td>
</tr>
<tr>
<td>Wt. of cylinder + aggregate, g (B)</td>
<td>399.3</td>
<td>399.4</td>
</tr>
<tr>
<td>Wt. of aggregate, g (F = B - A)</td>
<td>151.8</td>
<td>151.9</td>
</tr>
<tr>
<td>Uncompacted voids, (nearest 0.1%)</td>
<td>42.0</td>
<td>42.0</td>
</tr>
</tbody>
</table>

\[ U = \frac{(V - (F / Gsb))}{V} \times 100 \]

Fine Aggregate Angularity

SD 217
Method A

\[ V = 1000 \frac{M}{D} \]

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Density of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 F</td>
<td>0 C</td>
</tr>
<tr>
<td>60</td>
<td>15.6</td>
</tr>
<tr>
<td>65</td>
<td>18.3</td>
</tr>
<tr>
<td>70</td>
<td>21.1</td>
</tr>
<tr>
<td>75</td>
<td>23.9</td>
</tr>
<tr>
<td>80</td>
<td>26.7</td>
</tr>
<tr>
<td>85</td>
<td>29.4</td>
</tr>
</tbody>
</table>

Weight of measure and glass plate
weight of measure, glass plate & water
M = net mass of water
D = density of water at test temp.
V = volume of cylinder, mL

\[ U = \frac{(V - (F / Gsb))}{V} \times 100 \]

Average
Flat and Elongated Particles (SD 212)

- Now only required on mix design samples & process control samples
- Reference ASTM D 4791
Specification Compliance

• QC checks, compliance with all specifications, sign form, someone else check form and initial or sign, correct test size, overloaded sieves, provisions if any spec fails
• QA checks above items and compliance between QC and QA,
• IA checks, compliance between IA and QA or between IA and QC
• Similar/dissimilar, (SD 317)
• Provisions for reduction in test frequency
Test Reports and Control Charts

• (ACTM) Section 5 are the test forms,
  – results must be furnished on DOT test forms unless approved by the Engineer
• (Gyratory) numbering, reporting, and calculating procedures of the DOT
• Control Charts are to be maintained by the Contractor
Specification

- Reclaimed Asphalt Pavement (RAP) (plan note %)
- Dust to Binder (uses effective asphalt content)
- Burner Fuel up to #6 allowed (used motor oil allowed), need cert with delivery
- Adding Lime, aggregate must have at least 1.0 % moisture above SSD condition, enclosed twin-shaft pug mill must be used
- Bin splits adjusted only up to 5 percent
- Split companion tolerance will be 10 % on crushed particles test, 7 % on sand equivalent test
Construction

- New Standard Spec Book 2015 (black)
- Newest tests and mix design procedures are in the Materials Manual or sddot.com
- Gyratory Projects (about 50% have RAP)
- M S & T, automated part of Construction Management System (CMS) that deals with test forms and data for SDDOT employees
- Ride Specification on most Projects
Plant Site - Issues

- Stockpile contamination or segregation
- Bulkheads not used, material flowing into 2 bins
- Poor or unsafe aggregate sampling device
- Poor splitting procedures
- Not having proper scale and meter certs and checks
- Lime in air at plant site
- Burner fuel cert missing or incorrect material
With Bulkheads on Bins
QC Lab - Issues

- Incomplete records of equipment calibration
- No bulk specific gravity reheat test done
- Diaries not completed or lacking information and documentation
- Control charts not posted or updated in lab
- Back up samples not labeled or kept for correct amount of time
QA Lab - Issues

- Not taking Verification (QA) samples
- Not conducting QA sample and splitting
- Bulk specific gravity reheat not done
- Moisture in mix test not completed
- Back up samples not being retained
- Oil and lime cutoffs not witnessed
Recertification Exam

• Once the exam has started, you will have approximately 2 hours to complete the exam.

• The Exam is open book/notes (Standard Specifications for Roads and Bridges – 2015, QC/QA Asphalt Concrete Training Manual, SDDOT Materials Manual, and supplemental and errata specification)

• A score of 70% or better is required to pass the exam.