Roller Pattern, Control Strips and Test Sections with Method A & B

Roller Pattern and Control Strips:
• When, Where and How

Test Sections ‘aka’ as Lots:
• When, Where and How

• For both Method A and B in the Special Provision for Density Determination and

• The 2016 R&B Specification
Roller Pattern and Control Strips

Establishes the max achievable density for the mix for and sets the Nuclear Target for QC:

- New course of each new road way
- Combination of equipment and
- Job mix formula
- Paver pass of 6 feet and greater

Key inspection points:

- RP & CS Complete within first 1000’
- Representative of the new course
- Mat temperature is critical, RP & CS completed before mat cools to 150F
- Verify that CS cores meet specification
- The RP & CS is considered a Lot
Section 315.05(e)1a Control Strip is amended to replace the last paragraph with the following:

The control strip shall be considered a lot. If the control strip density conforms to the requirements specified in Table III-3, the Engineer will consider the control strip to be acceptable and the control strip density shall become the target control strip density.

<table>
<thead>
<tr>
<th>Mixture Type</th>
<th>Min. Control Strip Density (%)¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM-9.5A, 12.5A</td>
<td>92.5</td>
</tr>
<tr>
<td>SM-9.5D, 12.5D</td>
<td>92.5</td>
</tr>
<tr>
<td>SM-9.5E, 12.5E</td>
<td>92.5</td>
</tr>
<tr>
<td>IM-19.0A, IM-19.0D, IM-19.0E</td>
<td>92.2</td>
</tr>
<tr>
<td>BM-25.0A, BM-25.0D</td>
<td>92.2</td>
</tr>
</tbody>
</table>

¹The control strip density requirement is the percentage of theoretical maximum density of the job-mix formula by SUPERPAVE mix design or as established by the Engineer based on two or more production maximum theoretical density tests.

<table>
<thead>
<tr>
<th>% TMD</th>
<th>% of Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 96.5</td>
<td>95</td>
</tr>
<tr>
<td>92.2/92.5¹– 96.5</td>
<td>100</td>
</tr>
<tr>
<td>90.0–92.1/92.4¹</td>
<td>90</td>
</tr>
<tr>
<td>88.0–89.9</td>
<td>80</td>
</tr>
<tr>
<td>Less than 88.0</td>
<td>75</td>
</tr>
</tbody>
</table>

¹For SM-9.5 and SM-12.5 mixes, the minimum density value is 92.5% per Table III-3. For IM-19.0 and BM-25.0 mixes, the minimum density value is 92.2% per Table III-3.
315.05 (e) 1
The Engineer will divide the project into control strips” and “test sections” for the purpose of defining areas represented by each series of tests.

315.05 (e) 1 b. Test section (lot):
For the purposes of determining acceptance, the Engineer will consider each day’s production as a lot..... The standard size of a lot will be 5,000 linear feet (five 1,000 foot sublots) of any pass 6 feet or greater made by the paving train for the thickness of the course.
When and where to use Method A vs Method B on Paving Schedules

<table>
<thead>
<tr>
<th>Density Acceptance Method to be used</th>
<th>Route type</th>
<th>Traffic Group</th>
<th>Minimum roadway pavement width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 'A' (plugs or cores)</td>
<td>All interstate &amp; limited access primary</td>
<td>X and higher (&gt;2,000 ADT)</td>
<td>20'</td>
</tr>
<tr>
<td></td>
<td>Primary &amp; secondary with minimum traffic &amp; width</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Method 'B' (nuclear guage)</td>
<td>Primary &amp; secondary not meeting minimum traffic &amp; width</td>
<td>IX and lower (&lt; 2,000 ADT)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

TABLE III-2A
Density Acceptance Methods

Schedule: PM-7B-19

State Project Number: PM7B-967-F19, P401

Route: 29 (R-VA US00029SB)
Subdivision: XVII
Traffic Group: S
From Intersection: 5.64 Miles: Oak Hill Ct; Rt. 733E/W (Madison County)
To Intersection: 8.41 Miles: Oak Park Rd, Washington St, Rte 634N/S (Madison Co);
From Offset: 0 MI
To Offset: 0 MI

Public Comments:

<table>
<thead>
<tr>
<th>Item Code &amp; Description</th>
<th>Detail</th>
<th>Len (mi)</th>
<th>Wid (ft)</th>
<th>Dep (in)</th>
<th>Gal/SqYd</th>
<th>Lbs/SqYd</th>
<th>Quantity</th>
<th>UOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>10700 - RUMBLE STRIP, ASPHALT</td>
<td>R6 @ 12&quot; wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2559</td>
<td>LF</td>
</tr>
<tr>
<td>16350 - ASPHALT CONC. TY, SM-12.5A</td>
<td>4' Right Shoulder</td>
<td>2.77</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td>1251.3</td>
<td>TON</td>
</tr>
<tr>
<td></td>
<td>3' Left Shoulder Connections and Turn lanes</td>
<td>2.77</td>
<td>24</td>
<td></td>
<td></td>
<td>4485.18</td>
<td>TON</td>
<td></td>
</tr>
</tbody>
</table>
Method A Test Sections:

Required Testing:
QC via Two Nuclear Locations (Yellow)
Acceptance via One Core Location per 1000’ sub-lot (Black)

Each day’s production is a Lot – made up of test sections and sub lots. Pay adjustments are calculated based on the materials within the lot.
Method B Test Sections:

Required Testing (per 1000’):
Two Nuclear Locations (Yellow)

Same as the 2016 Road and Bridge Specification for Section 315
Applying price adjustments to Test Sections (Lots):

2016 Road and Bridge Section 315.05:
The tonnage of each lot will be based on the lot’s width and length and the mixture application rate as designated in the Contract or as revised by the Engineer. Payment will be made in accordance with Table III-4.

The Special Provision for Density Determination:
The tonnage of each lot will be based on the lot’s width and length and the mixture application rate as designated in the Contract or as revised by the Engineer. Payment will be made in accordance with the requirements of Table III-4A (or III-4B for Method B).
Test Section Widths:

Define the width of the Lot

Defines the width of the testing area and random numbers

Tests are not conducted within 12”/18” of application width
Lot Length and Turn Lanes

The Engineer will divide the project into “control strips” and “test sections” for the purpose of defining areas represented by each series of tests.

The Engineer needs to determine whether these areas are part of the lot, and if so then they need to be tested, i.e. select random numbers and test locations within these lengths as well:

When paving is less than 3,000 feet, that day’s production will be combined with the previous day’s production or added to the next day’s production to create a lot as described below.
Calculating Lot tonnages for Price Adjustments TL-59A

\[ L(4936') \times W(13') / 9 \text{sqyd} \times 230 \text{lbs/sqyd} / 2000 = 819.92 \text{ Tons} \]

Asphalt Concrete Density Acceptance Test Report - Method A

<table>
<thead>
<tr>
<th>Production Date:</th>
<th>4/23/19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project/Schedule Number:</td>
<td>PM7B-967-F19</td>
</tr>
<tr>
<td>Test Section (Lot) #:</td>
<td>5</td>
</tr>
<tr>
<td>Total paved length (ft):</td>
<td>4,936</td>
</tr>
<tr>
<td>Calculated tonnage:</td>
<td>819.92</td>
</tr>
<tr>
<td>Asphalt Mix Type:</td>
<td>SM-12.5 A</td>
</tr>
</tbody>
</table>

Route & Direction: RT 33

From (Station, MP): .4 W. Rt 625

Application Width (ft): 13

Asphalt Producer: SLWCO

Job Mix ID: 7024-2019-32

Paving Contractor: SLWCO

To (Station, MP): .75 Mi. E. Rt 638

Application Rate (lbs/sy): 230

Asphalt Plant: RUCKERSVILLE

Control Strip Information:

1. Control Strip Number and Date: CS 2 4/17/19
2. CS Density: 148.2 lbs/ft³
3. Min Longitudinal Joint Density: 140.79 lbs/ft³ (= 95% CS Density)

Acceptance Testing Results By Plugs/Cores:

Daily Gmm: 2.578

Plant Lot & Sample #s for Gmm testing: 2019-01 Sub 7 & 8
### Core Results from the same TL-59A

3. Min Longitudinal Joint Density: 140.79 lbs/ft³ (≈ 95% CS Density)

#### Acceptance Testing Results By Plugs/Cores:

<table>
<thead>
<tr>
<th>Sub Lot</th>
<th>Distance (ft)</th>
<th>Offset (ft)</th>
<th>Thickness (in)</th>
<th>Weight in Air [A]</th>
<th>Weight in H₂O [B]</th>
<th>SSD Weight [C]</th>
<th>Volume (C-B)</th>
<th>Gain (A/(C-B))</th>
<th>%Gain</th>
<th>Bonus Eligible</th>
<th>Longitudinal Joint Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>255</td>
<td>4</td>
<td>2&quot;</td>
<td>902.1</td>
<td>535.1</td>
<td>902.7</td>
<td>367.6</td>
<td>2.45</td>
<td>95.0%</td>
<td>1</td>
<td>142.8</td>
</tr>
<tr>
<td>2</td>
<td>1752</td>
<td>5</td>
<td>2&quot;</td>
<td>1084.1</td>
<td>639.5</td>
<td>1085.1</td>
<td>445.6</td>
<td>2.43</td>
<td>94.3%</td>
<td>1</td>
<td>145.1</td>
</tr>
<tr>
<td>3</td>
<td>2149</td>
<td>8</td>
<td>2&quot;</td>
<td>1065.5</td>
<td>631.2</td>
<td>1066.4</td>
<td>435.2</td>
<td>2.45</td>
<td>95.0%</td>
<td>1</td>
<td>146.5</td>
</tr>
<tr>
<td>4</td>
<td>3303</td>
<td>9</td>
<td>2&quot;</td>
<td>932.4</td>
<td>548.4</td>
<td>933.2</td>
<td>384.8</td>
<td>2.42</td>
<td>93.9%</td>
<td>1</td>
<td>145.1</td>
</tr>
<tr>
<td>5</td>
<td>4926</td>
<td>6</td>
<td>2&quot;</td>
<td>1174.1</td>
<td>687</td>
<td>1175.6</td>
<td>488.6</td>
<td>2.40</td>
<td>93.1%</td>
<td>1</td>
<td>144.6</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pay Factor from S315HP1 Table III-A: 105%

#### Averages:

- Daily Gain: 2.578
- Plant Lot & Sample # for Gmm testing: 2019-01 Sub 7 & 8
- Percent of sub lots meeting bonus criteria: 100.0%

Field Level II Technician: Susan Casady

Field Level II Inspector: 

Comments: 

Date: 4/23/19
Total shipped tons from that day’s paving = 976.61

VIRGINIA DEPARTMENT OF TRANSPORTATION
WEIGHPERSON’S SUMMARY

This is to certify that S.L. Williamson Company, Inc. (24) Ruckersville

Shipped the following materials on the below reference date.

Shift Start Date: 4/23/2019 6:00 AM End Date: 4/23/2019 6:00 PM

Project: PM7B-967-F19,P401 UPC ID: 112989

Route: 33

County: Greene

Acceptance Program: ☑ Quality Assurance ☐ Modified Acceptance Program

Type Material: Superpave SM-12.5A (50 gyration)

Job Mix ID: 7024-2019-32 Identifier:

Lot Number: 201901 Order:

No. Loads: 45

Total English Tons: 976.61
Reconciling the tonnage:

Calculated Tonnage from the Lot Testing – 819 tons
Shipped Tonnage from the TL-102s – 976 tons
What gives? Where did the 157 tons go?

Connections, crossovers, gore areas.. Double check your dimensions and lift thickness

Schedule: PM-7B-19

State Project Number: PM7B-967-F19, P401

Route: 33 (R-VA US00033EB)
Subdivision: XIII
Traf Grp: From Intersection: 2.99 Miles: Goose Pond Rd; Rt. 625N/S (Greene County)
From Offset: -0.4MI
To Intersection: 5.09 Miles: Dunivan Ln; Powell Mountain Rd; Timber Dr; Ramp Intersection
To Offset: 0.06MI
Public Comments: Detail

<table>
<thead>
<tr>
<th>Item Code &amp; Description</th>
<th>Len(mi)</th>
<th>Wid(ft)</th>
<th>Dep(in)</th>
<th>Gal/SqYd</th>
<th>Lbs/SqYd</th>
<th>Quantity</th>
<th>UOM</th>
</tr>
</thead>
<tbody>
<tr>
<td>16350 - ASPHALT CONC. TY. SM-12.5A</td>
<td>2.56</td>
<td>26</td>
<td>230</td>
<td>4490.58</td>
<td>TON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16350 - ASPHALT CONC. TY. SM-12.5A</td>
<td>2.56</td>
<td>26</td>
<td>2</td>
<td>39048.53</td>
<td>SY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16522 - FLEXIBLE PAVE.PLANNING 0&quot;-2&quot;</td>
<td>2.56</td>
<td>26</td>
<td>230</td>
<td>4490.58</td>
<td>TON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16522 - FLEXIBLE PAVE.PLANNING 0&quot;-2&quot;</td>
<td>2.56</td>
<td>26</td>
<td>2</td>
<td>39048.53</td>
<td>SY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Applying Price Adjustments on the total

Calculated Tonnage from the Lot Testing – 819 tons is subject to price adjustments, in this case a 5% bonus

• Method A
• Method B and
• 2016 Road and Bridge Specification

While the 157 tons is paid for at the unit bid price
Method A Bonus Language
If a minimum of 80% of each lot’s core/plug samples is no lower than 92.5% of TMD for Surface Mixes and 92.2% of TMD for Intermediate and Base Mixes and the lot average results in 100% payment, then the Engineer will increase the unit bid price for AC mixture by five (5) percent.

### TABLE III-4A
**Payment Schedule for Method A Lot Densities**

<table>
<thead>
<tr>
<th>% TMD</th>
<th>% of Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 96.5</td>
<td>95</td>
</tr>
<tr>
<td>92.2/92.5 – 96.5</td>
<td>100</td>
</tr>
<tr>
<td>90.0 – 92.1/92.4</td>
<td>90</td>
</tr>
<tr>
<td>88.0 – 89.9</td>
<td>80</td>
</tr>
<tr>
<td>Less than 88.0</td>
<td>75</td>
</tr>
</tbody>
</table>

1For Intermediate and Base Mixes, the minimum TMD percentage is 92.2% per Table III-3
2For Surface Mixes, the minimum TMD percentage is 92.5% per Table III-3

### TABLE III-4B
**Payment Schedule for Method B Lot Densities**

<table>
<thead>
<tr>
<th>% of Target Control Strip Density</th>
<th>% of Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 102.0</td>
<td>95</td>
</tr>
<tr>
<td>98.0 to 102.0</td>
<td>100</td>
</tr>
<tr>
<td>97.0 to less than 98.0</td>
<td>95</td>
</tr>
<tr>
<td>96.0 to less than 97.0</td>
<td>90</td>
</tr>
<tr>
<td>Less than 96.0</td>
<td>75</td>
</tr>
</tbody>
</table>
Problems that arise

Paved length – 8316’
Calculated Tonnage
Reported as – 1064.86
but calculates to 1219.7

Testing only accounted for 7500’
We left 815 feet untested

TL-102 tonnage reported as 1064.86
How to handle partial sub-lots at the end of the day
Thank You and have a great and Safe paving season!