Guidance for the use of the Statistical Program for Non-Specification Materials

2012

State Materials Lab
4/22/2012
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Introduction

This document is intended to give direction to the project office on how to deal with statistically accepted materials that are failing or do not meet specification.

This document also gives direction on the proper way to use SAM for failing materials and how to enter a contractor challenge or retest into the SAM program.

Addressing Non-Specification Material

Section 3-04.3(7)D3 of the Standard Specifications provides direction on how to address materials with unacceptable pay factors and requires the following: The Contractor shall shut down operations and shall not resume placement of the aggregate until such time as the Project Engineer is satisfied that material conforming to the specification can be produced:

1. When the Composite Pay Factor (CPF), for a lot in progress, is less than 1.00 and the contractor is taking no corrective action, or
2. When the Pay Factor (PF) for any component of the lot in progress, is less than 0.95 and the contractor is taking no corrective action, or
3. When either the Individual Pay Factor (PFi) for any constituent or the CPF for a lot in progress is less than 0.75.

Section 3-04.3(7)D4 of the Standard Specifications requires that an entire lot with a CPF of less than 0.75 will be rejected.

Sublot Sizes

For aggregate, the sublot is based on plan quantities and will be determined to the nearest 100 tons (50 cy). The maximum sublot size will be as defined in the Standard Specifications. Section 3-04, Table 1.

For Hot Mix Asphalt, Section 5-04.3(8)A4 states the following: The sublots shall be approximately uniform in size with a maximum sublot size of 800-tons. The quantity of material
represented by the final sublot for either statistical or non-statistical evaluation may be increased to a maximum of two times the sublot quantity calculated. Section 5-04.3(10)B1 requires that sublots will be uniform in size with a maximum of approximately 80 tons per sublot; the final sublot of the day may be increased to 120 tons.

For Portland Cement Concrete Pavement, Section 5-05.3(4)A requires that the sublot size shall be determined to the nearest 10 cubic yards to provide not less than three uniform sized sublots with a maximum sublot size of 500 cubic yards.

**Aggregate Source Approval Samples**

Aggregate source approval samples are taken for determining which aggregate sources meet specification and can be considered for use on projects. These samples are not acceptance samples and are only used for source approval and should not be entered into SAM.

**Aggregate Sample Frequencies**

It is critical that the correct number of tests are taken and that all tests are taken within the proper testing frequency to ensure representative sampling of the material. It is also important to track the material quantities placed during the life of the project to insure that the correct sampling frequency is performed and testing completed.

For statistically accepted materials, a sample represents a quantity of material for a given sampling frequency. The sample must be taken during the placement of the material and within the sampling frequency. The sample cannot be taken prior to or after the fact.

When the sample of material is taken, it represents the material on the day it was sampled therefore, enter the date the material was sampled into SAM as the test date.

**HMA – Contractor Challenge or Retest**

According to the Standard Specification Section 5-04.3(8)A5, the Contractor may request the retest of a sublot within 7-calendar days after the specific test results have been posted to the
SAM website. When a retest is required a split of the original acceptance sample must be sent to either the Region Materials Laboratory or the State Materials Laboratory, as determined by the Project Engineer, to perform the retest. The challenge sample will be tested for a complete gradation analysis, asphalt binder content, and V_a, and the test results will be used for the acceptance of the HMA in SAM. The test results of the retest replace the original sublot sample test results in SAM for that sublot.

Once the retesting has been completed, go to the original sublot test data in SAM. Click to edit the sublot data.

Once the original data opens, click on the retest button. A new column will be added called, “Retest Value”.

![Image of data sheet]

Once the retesting has been completed, go to the original sublot test data in SAM. Click to edit the sublot data.
Note that the sublot number now has an “- R” after it. The -R shows that the data is retest data and this will be used for the acceptance of this sample. **Do Not Delete** the original data and replace it with the retest value.

Be sure to select the test lab otherwise the information will not save and you will receive an error message. In most cases it will be the “Region Lab – Acceptance”

Manually enter the retest values into the Retest Value column. **SAM** will then automatically recalculate the statistical values using the retest values.
There should be an appropriate comment added to clarify what was done such as:

“Results challenged by contractor on 10/25/10. Results entered in SAM on 10/29/10. Contractor assessed $250 for testing.”

According to the Standard Specification Section 5-04.3(8)A5, the cost of testing for the challenge test will be deducted from any monies due or that may come due the Contractor under the Contract at the rate of $250 per sample. This is typically done as a “below the line deduction”.

**HMA Compaction – Contractor Challenge or Retest**

According to the Standard Specification Section 5-04.3(10)B4, a compaction sublot that did not meet the minimum of 91 percent of the reference maximum density in a compaction lot with a CPF below 1.00 and thus subject to a price reduction or rejection, the Contractor may request that a core be used for determination of the relative density of the sublot. This section goes on to state that the contractor must make the request for the cores by noon of the next workday after the test results have been posted to the website. The relative density of the cores will replace the relative density determined by the nuclear moisture-density gauge for the sublot in SAM. The new relative density determinations from the cores will be used for calculation of the CPF and acceptance of HMA compaction lot.

To enter the retest data, go to the original sublot test data in SAM. Click the edit link of the sublot data.
Once the original data opens, click on the retest button. A new column will be added called, “Retest Value”.

Note that the subplot number now has a “- R” after it. The -R shows that the data is retest data and this will be used for the acceptance of this sample. **Do Not Delete** the original data and replace it with the retest value.
Be sure to select the test lab otherwise the information will not save and you will receive an error message. In most cases it will be the “Region Lab – Acceptance”

Manually enter the retest values into the Retest Value column. SAM will then automatically recalculate the statistical values using the retest values.

There should be an appropriate comment added to clarify what was done such as:

“Results challenged by contractor on 10/22/10 at 9:15 AM. Results entered in SAM on 10/27/10. Contractor assessed $200 for testing.”

According to the Standard Specification Section 5-04.3(10)B4, states that when the CPF for the lot based on the results of the HMA cores is less than 1.00, the cost for the coring will be deducted from any monies due or that may become due the Contractor under the Contract at the rate of $200 per core and the Contractor shall pay for the cost of the traffic control. This is typically done as a “below the line deduction”.

**Rejecting Non-Specified Material**

Section 1-06.2(2)B of the Standard Specifications states a lot containing non-Specification material which fails to obtain a 0.75 Composite Pay Factor will be rejected by the Engineer. The Engineer will take one or more of the following actions when rejected material has been incorporated into the Work:
1. Require complete removal and replacement with Specification material at no additional cost to the Contracting Agency.

2. At the Contractor’s written request, allow corrective work at no additional cost to the Contracting Agency and then an appropriate price reduction that may range from no reduction to no payment.

3. At the Contractor’s written request, allow material to remain in place with an appropriate price reduction that may range from a designated percentage reduction to no payment.

1. If the Engineer requires the removal and replacement of the material, see the remove and replace rejected materials section below for how to handle this in the SAM program.

2. If the Contractor requests to allow corrective action work to be performed, a State Construction Office approved change order will be required to approve the corrective action, and to accept material that has a CPF of less than 0.75. State Construction Office will determine the appropriate price reduction.

The lot that was rejected will technically become an isolated independent lot. Comments can be added to the “Materials Acceptance Criteria” stating the lot XX was rejected, refer to change order XX. Depending on the corrective action required, additional testing might be required to accept the material. When work resumes, a new lot will have to be started. The additional testing is then included in the new lot. Follow the steps in Setting up an Isolated Independent Lot for establishing a new production lot.

3. If the Contractor requests to allow the material to remain in place with an appropriate price reduction, a State Construction Office approved change order will be required to allow the rejected material that has a CPF of less than 0.75 to remain in place. State Construction Office will determine the appropriate price reduction.

The lot that was rejected will technically become an isolated independent lot. Comments can be added to the “Materials Acceptance Criteria” stating the lot XX was rejected, refer to change order XX. When work resumes, a new lot will be started. Follow the steps in “Setting up an Isolated Independent Lot” below for establishing a new production lot.

**Rejecting Without Testing**

According to Standard Specification Section 5-04.3(11)C, the Project Engineer may, without sampling, reject any load or stockpile that appears defective. If the Contractor elects to have the rejected material tested, a minimum of three random samples of the suspect material will be
obtained and tested. The material will then be evaluated as an independent lot in accordance with Section 1-06.2(2). Follow the steps below for setting up an isolated independent lot.

If the CPF for the isolated independent lot is below 0.75, follow the directions for “Rejecting Non-Specified Material” above.

**Rejecting a Partial Sublot**

According to Standard Specification Section 5-04.3(11)D1, the Project Engineer may also isolate from a normal sublot any material that is suspected of being defective. Such isolated material will not include an original sample location. A minimum of three random samples of the suspect material will be obtained and tested. The material will then be evaluated as an independent lot in accordance with Section 1-06.2(2).

A new lot for the isolated material needs to be established, see “Defining an Isolated Independent Lot” above.

Three samples shall be obtained, tested and the test data entered into the new isolated independent lot.

The quantities of the original sublot need to be reduced by the amount of material in the isolated independent lot. If the original sublot was 2,000 tons, and the isolated lot has 600 tons, then the original lot should be reduced to represent 1,400 tons.

If the isolated independent lot of material is included in two sublots, say 600 tons, 400 tons from subplot 1 and 200 tons from subplot 2, then 3 samples need to be tested. The quantities in both subplot 1 and 2 need to be adjusted accordingly.

If the CPF for the isolated independent lot is below 0.75, follow the directions for “Rejecting Non-Specified Material” above.

**Rejecting an Entire Sublot**

According to Standard Specification Section 5-04.3(11)D2, The Project Engineer can reject an entire sublot that is suspect of being defective. When a sublot is rejected a minimum of 2 additional samples from this sublot will be obtained. These additional samples and the original sublot will be evaluated as an independent lot in accordance with Section 1-06.2(2).
A new lot for the isolated material needs to be established, see “Defining an Isolated Independent Lot” above.

In this example, they rejected HMA compaction sublot 31. They isolated the sublot and renamed it MD100083 lot 31.

Two additional samples shall be obtained, tested and the test data entered into the new isolated independent lot along with the original sublot test data.

Note, for HMA compaction, all three tests shall be performed the same way, i.e. by nuclear gauge or by cores.

There should be an appropriate comment added to each test to clarify what was done such as the examples below:
When a sublot has been rejected and an independent isolated lot has been established, the original lot needs to be adjusted for the removed the sublot.

This is done by changing the tonnage for sublot 31 to “0”. This way the original lot will still calculate the CPF based on 14 samples and will not include the test data for sublot 31. The original test data for sublot 31 needs to remain in the original lot.

Note, if the testing was originally performed in MATS, then the change to the tonnage has to be made in MATS and the record saved. To bring the data into SAM click the “Refresh MATS Data” button and the tonnage will be adjusted.

If the CPF for the isolated independent lot is below 0.75, follow the directions for “Rejecting Non-Specified Material” above.

### Rejecting a Lot in Process

Standard Specification Section 5-04.3(11)D3 states that the Contractor shall shut down operations and shall not resume placement of the aggregate until such time as the Project Engineer is satisfied that material conforming to the specification can be produced:

- When the Composite Pay Factor (CPF), for a lot in progress, is less than 1.00 and the contractor is taking no corrective action, or
b. When the Pay Factor (PF) for any component of the lot in progress, is less than 0.95 and the contractor is taking no corrective action, or

c. When either the PFi for any constituent or the CPF for a lot in progress is less than 0.75.

When the PE is satisfied that satisfactory material is being produced and the work continues, the new material shall be tested and the test data recorded in SAM in the current lot in progress. This does not start a new lot.

For HMA, the contractor can request a new lot to start. See “Starting a New HMA Lot” below.

**Rejecting an Entire Lot**

Standard Specification Section 5-04.3(11)D4 states that an entire lot with a CPF of less than 0.75 will be rejected. Refer to “Rejecting Non-Specified Materials” for further directions above.

**Remove and Replace Rejected Materials**

When the removal and replacement of a material has been approved, the following steps must be followed.

1. The original lot or lots needs to be reduced by the quantity of material removed. If the original sublot was 2,000 tons, and the removed material was 600 tons, then the original lot should be reduced to represent 1,400 tons.

   If the removed material is included in two sublots, say 600 tons, 400 tons from sublot 1 and 200 tons from sublot 2, the quantities in both sublot 1 and 2 need to be adjusted accordingly.

2. If an entire sublot is removed, change the tonnage for the sublot to “0”. This way the original lot will still calculate the CPF based on 14 sublots. The CPF will not include the test data for the original removed sublot. The original test data from the sublot needs to remain in the original lot for historical use.

Note, if the testing was originally performed in MATS, then the change to the tonnage has to be made in MATS and the record saved.
To bring the data into SAM click the “Refresh MATS Data” button and the tonnage will be adjusted.

3. An appropriate comment needs to be added to clarify what was done.

4. When the material is replaced, the testing of the material will be recorded in the current lot at the time of placement and not included in the lot from which it was rejected.

5. If this is HMA, than the quality of material removed also needs to be removed in the appropriate compaction lots and sublots.

HMA Compaction – Remove and Replace

When the removal and replacement of HMA for poor compaction has been approved, the following steps must be followed.

1. The original lot or lots needs to be reduced by the quantity of material removed. If the 200 tons is to be removed, then the original lot should be reduced to 1,000 tons. 15 sublots at 80 tons each equals 1,200 tons minus the 200 tons removed leaves 1,000 tons.
The 200 tons could be 2 sublots completely removed and partial removal for 2 other sublots, 15 tons, 80 tons, 80 tons, and 25 tons.

For the 2 partial sublots, the quantities in both sublots need to be adjusted accordingly, from 80 tons to 65 tons and 55 tons.

2. For the entire sublots that are removed, change the tonnage for the sublots to “0”. In this case, the original lot will still calculate the CPF based on 1,000 tons and 13 sublots. The CPF will not include the test data for the original sublot that has been removed. The original test data from the sublot that was removed needs to remain in the original lot for historical use.

Note, if the testing was originally performed in MATS, then the change to the tonnage has to be made in MATS and the record saved. To bring the data into SAM click the “Refresh MATS Data” button and the tonnage will be adjusted.

3. An appropriate comment needs to be added to clarify what was done.

4. When the material is replaced, the testing of the material will be recorded in the current lot at the time of placement and not included in the lot where it was rejected from.

5. Since the HMA was removed based on poor compaction, the quality of the removed HMA also needs to be removed in the appropriate HMA mixture lot.

<table>
<thead>
<tr>
<th>Sub Lot Number</th>
<th>Sample Size</th>
<th>Date Tested</th>
<th>Test</th>
<th>Sub Lot Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>016</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.80</td>
<td></td>
</tr>
<tr>
<td>017</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.20</td>
<td></td>
</tr>
<tr>
<td>018</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.90</td>
<td></td>
</tr>
<tr>
<td>019</td>
<td>65.00</td>
<td>10/06/2010</td>
<td>91.00</td>
<td>15 tons of this sublot was removed and replaced.</td>
</tr>
<tr>
<td>020</td>
<td>0.00</td>
<td>10/06/2010</td>
<td>90.30</td>
<td>This Sublot has been removed and replaced. See sublot 29 for results.</td>
</tr>
<tr>
<td>021</td>
<td>0.00</td>
<td>10/06/2010</td>
<td>89.50</td>
<td>This Sublot has been removed and replaced. See sublot 30 for results.</td>
</tr>
<tr>
<td>022</td>
<td>55.00</td>
<td>10/06/2010</td>
<td>91.10</td>
<td>25 tons of this sublot was removed and replaced.</td>
</tr>
<tr>
<td>023</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.20</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>94.10</td>
<td></td>
</tr>
<tr>
<td>025</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.10</td>
<td></td>
</tr>
<tr>
<td>026</td>
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<td>10/06/2010</td>
<td>93.70</td>
<td></td>
</tr>
<tr>
<td>027</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.50</td>
<td></td>
</tr>
<tr>
<td>028</td>
<td>80.00</td>
<td>10/06/2010</td>
<td>93.50</td>
<td></td>
</tr>
<tr>
<td>029</td>
<td>80.00</td>
<td>03/22/2012</td>
<td>93.40</td>
<td>This sublot replaces sublot 20</td>
</tr>
<tr>
<td>030</td>
<td>80.00</td>
<td>03/22/2012</td>
<td>93.80</td>
<td>This sublot replaces sublot 21</td>
</tr>
</tbody>
</table>
HMA – Starting a New Lot

The Contractor can request a new HMA lot be started when a lot in progress has a CPF less than 0.75 and after the Project Engineer is satisfied that material conforming to the Specifications can be produced. This only applies to HMA.

To do this, in SAM go to the “Materials Acceptance Criteria” page and open the original mix design information. At the bottom of the page is a button called “PE Override”. Press this button and a copy of the original information will appear with a new “Material ID” number MD110026.PE1. This also opens the JMF so requested and approved changes can be made to the JMF.
Setting up an Isolated Independent Lot

To set up an independent lot you will have to do the following:

In SAM for the work order you are working with, you will have to select “Add New Material”. For HMA, since the Mix ID has already been entered into SAM you will have to give a new “Material ID” such as “MD26 Isolate 1”. The JMF will have to be manually entered.

For aggregate, you can give the material a new name such as “CSBC Isolate 1” and click Get Specifications”.

There should be an appropriate comment added to clarify what was done such as:

“On 10/23/10 the PE rejected two loads of HMA without testing because there appeared to be lacking enough binder. The contractor requested testing. This is the isolated lot for the rejected HMA.”

Or

“On 10/23/10 the PE rejected two loads of CSBC without testing because there appeared to be large amounts of round aggregate. The contractor requested testing. This is the isolated lot for the rejected CSBC.”
Help
If you have any problems or questions with the new SAM program. Please contact the MATS Lab Help Desk at mloh@wssdot.wa.gov or 360-709-5454.