

Quick Reference Guide

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PC Paving - OGCMD - Revising Contract S&T's

July 22, 2009

If the contractor has elected to use the Optimized Gradation Concrete Mix Design (OGCMD) Special Provision, it is likely, the project also has the QC/QA special provision for concrete paving. Please refer to the QRG for "PC Paving - QC/QA - revising Contract S&T's" for very important instructions prior to making the following revisions. It is recommended to print out that QRG and following the instructions.

It is assumed for the examples presented below, that some of the PC paving will be OGCMD and some will not. Because these different concretes are lumped under the same [CY] pay item, adjustments will be required to testing frequencies to "fool" SiteManager into the correct number of aggregate tests for each type of concrete. Typically there should be no revisions necessary to the fresh concrete or cylinder testing to account for OGCMD. The primary issue is the different aggregate material codes necessary for OGCMD. You will need a copy of the optimized mix design for the amount of aggregate in a CY.

Two alternative procedures will be presented in this QRG.

- Alternative 1: Track all aggregates under the PC Concrete for Pavement [CY] pay item (Simple math, few S&T revisions needed).
- Alternative 2: Add aggregate materials under the individual PC Concrete Placement [SY] pay items (extensive SM revisions required).

For both procedures the following assumptions are made:

- There is QC/QA
- Total of 54 sub lots (54 samples)
- 24 of the sub lots will be OGCMD
- 30 of the sub lots will be normal concrete
- Optimized concrete will use aggr080 material code
- Normal concrete will use aggr054 and aggr057 material codes

Alternative 1 Procedure:

To use this procedure you must first know how many samples will be required for each type of concrete (normal concrete and OGCMD concrete). This will require a review of the plans, special provisions, summary of surfacing quantities and perhaps discussion with the contractor to understand where he will utilize OGCMD (mainline, shoulders, crossovers, etc.). We are assuming this is a QC/QA project, so the required number of samples can be determined by looking at the number of sub lots there will be. The downside to alternative One is that SM will not do a good job of tracking the number of samples required to be tested in real time, but by the end of the paving, the number of samples taken should balance with the number required. Utilize the following equation to determine sampling frequency:

Frequency = (Material Quantity / number of tests)

Step 1: Adjust the Frequency of the aggregate tests on material codes aggr054 (fine aggregate) and aggr057 (coarse aggregate) for the non-optimized concrete. Go to the Contract Sampling and Testing Requirements, select your contract and the correct concrete paving pay item (typically the one with [CY] units).

Step 2: Compute Sampling/Testing Frequency for Fine Aggregate in Non-optimized concrete:
 $27209.954 / 30 \text{ sublots} = 907$

Contract Sample and Testing Requirements			
Materials		Sample and Testing	
Contract	090182	Project	1362606
Bid Item Code	414(P) 6000	Item Unit	CY
Desc. 1:	(SP)P.C. CONCRETE FOR PAVEMENT		
Desc. 2:			
Supp Desc1			
Supp Desc2			
Material Code:	aggr054	HC Conc Aggregate, Fine - Natural	
Conversion Factor:	.62520	☐	Approved Source Required
Material Quantity:	27,209.954	Material Unit:	TON
Special Instruction:			

Step 3: Revise Frequency for Fine Aggregate in SiteManager. It is typically recommended to round **down** a little on the frequency to ensure you obtain sufficient samples to cover the requirements in QC/QA.

Contract Sample and Testing Requirements

Materials | **Sample and Testing**

Contract: 090182 Project: 1362606 Bid Item Code: 414(P) 6000 Item Unit: CY

Material: aggr054 **Material Desc.:** HC Conc Aggregate, Fine - Natural

Desc. 1: (SP)P.C. CONCRETE FOR PAVEMENT

Desc. 2:

Supp Desc1:

Supp Desc2:

Producer Supplier Code	Sample Type	Acceptance method	Test Method
	MAT Material	CRES Construction Residency	T27

Producer Supplier Code:

Sample Type: MAT Material

Acceptance Method: CRES Construction Residency

Test Method: T27 Sieve Analysis of Fine and Coarse Aggregates

Sample Location: N/A

Sample Units: TON

Sample Responsibility: Construction Residency

Test Responsibility: Construction Residency

Rate: 1

Samples per: **Frequency** 900,000

Sample Size: 1 bag

Step 4: Add a comment in the remarks bubble with the date and your initials: example: 7/20/09: *adjusted frequency for QC/QA and OGCMD. JSS*

Step 5: Compute Sampling/Testing Frequency for Coarse Aggregate in Non-optimized concrete:
 $39870.504 / 30 \text{ sublots} = 1329$

Contract Sample and Testing Requirements

Materials

Sample and Testing

Contract 090182 **Project** 1362606 **Bid Item Code** 414(P) 6000 **Item Unit** CY

Desc. 1: (SP)P.C. CONCRETE FOR PAVEMENT
Desc. 2:
Supp Desc1
Supp Desc2

Material Code: aggr057 **HC Conc Aggregate No 57, Coarse**

Conversion Factor: .91610 ☐ **Approved Source Required**

Material Quantity: 39,870.504 **Material Unit:** TON

Special Instruction:

Step 6: Revise Frequency for Coarse Aggregate in SiteManager. It is typically recommended to round **down** a little on the frequency to ensure you obtain sufficient samples to cover the requirements in QC/QA.

Contract Sample and Testing Requirements

Materials

Sample and Testing

Contract 090182 **Project** 1362606 **Bid Item Code** 414(P) 6000 **Item Unit** CY

Material aggr057 **Material Desc.** HC Conc Aggregate No 57, Coarse

Desc. 1: (SP)P.C. CONCRETE FOR PAVEMENT
Desc. 2:
Supp Desc1
Supp Desc2

Producer Supplier Code	Sample Type	Acceptance method	Test Method
	MAT Material	CRES Construction Residency	T27

Producer Supplier Code:
Sample Type: MAT Material **Acceptance Method:** CRES Construction Residency
Test Method: T27 Sieve Analysis of Fine and Coarse Aggregates

Sample Location: N/A **Rate** 1 **Samples per.:** 1,320.000
Sample Units: TON **Sample Size:** 1 bag
Sample Responsibility: Construction Residency
Test Responsibility: Construction Residency

Step 7: Add a comment in the remarks bubble with the date and your initials: example: 7/20/09: *adjusted frequency for QC/QA and OGCMD. JSS*

Step 8: Add a new material code to document the optimized gradation. We will add aggr080 to the same pay item we have been working with so far.

Click on the Materials tab of any material on the item and select the new icon. In the material code field, type aggr080. In the Conversion Factor field input the amount of aggregate in a CY of optimized concrete. This must be in TONS. SiteManager will compute the Material Quantity.

AASHTO SiteManager

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Contract Sample and Testing Requirements

Materials Sample and Testing

Contract 090182 Project 1362606 Bid Item Code 414(P) 6000 Item Unit CY

Desc. 1: (SP)P.C. CONCRETE FOR PAVEMENT

Desc. 2:

Supp Desc1

Supp Desc2

Material Code:

Conversion Factor: .00000 ☐ Approved Source Required

Material Quantity: Material Unit:

Special Instruction:

Step 9: Compute Sampling/Testing Frequency for Aggregate in the Optimized concrete: 70553.514 / 24 sublots = 2940

Contract Sample and Testing Requirements			
Materials		Sample and Testing	
Contract	090182	Project	1362606
Bid Item Code	414(P) 6000	Item Unit	CY
Desc. 1:	(SP)P.C. CONCRETE FOR PAVEMENT		
Desc. 2:			
Supp Desc1			
Supp Desc2			
Material Code:	aggr080	HC Conc Aggregate, OGCMD Combined	
Conversion Factor:	1.62110	☐	Approved Source Required
Material Quantity:	70,553.514	Material Unit:	TON
Special Instruction:	based on avg of the 3 thicknesses		

Step 10: Add the Material testing requirements to this new material code on the Sampling and Testing Tab. You will need to input the following information: Sample Type, Acceptance method, test method, sample location, rate, frequency, sample units, sample size, sample responsibility, test responsibility, so it looks like the screen below:

Contract Sample and Testing Requirements

Materials | **Sample and Testing**

Contract: 090182 | Project: 1362606 | Bid Item Code: 414(P) 6000 | Item Unit: CY

Material: aggr080 | Material Desc.: HC Conc Aggregate, OGCMDC Combined

Desc. 1: (SP)P.C. CONCRETE FOR PAVEMENT

Desc. 2:

Supp Desc1

Supp Desc2

Producer Supplier Code	Sample Type	Acceptance method	Test Method
	MAT Material	CRES Construction Residency	T27

Producer Supplier Code:

Sample Type: MAT Material | Acceptance Method: CRES Construction Residency

Test Method: T27 | Sieve Analysis of Fine and Coarse Aggregates

Sample Location: N/A | Rate: 1 | Samples per.: 2,925.000

Sample Units: TON | Sample Size: 1 bag each

Sample Responsibility: Construction Residency

Test Responsibility: Construction Residency

Step 11: Add a comment in the remarks bubble with the date and your initials: example: 7/20/09: added material code for OGCMDC aggregate. JSS

Step 12: Run the Sampling checklist process to update S&T requirements in the system. See the QRG, "Sampling Checklist".

NOTE: when creating sample records of these aggregates, use the frequencies computed above when filling in the Represented quantity field on the Contract Tab of the sample record. It is typically recommended to round this quantity **up** a little to ensure SM knows you have enough material sampled in case there are minor variations to the pay item quantity.

Alternative 2 Procedure:

The primary assumption that needs to be made to use this alternative, is that all of the OGCMDC concrete is used in the dowel-jointed concrete, and that all of the dowel-jointed concrete is OGCMDC. All of the non dowel-jointed concrete will be normal concrete (non OGCMDC). In addition there needs

to be separate pay items for the Placement of dowel-jointed and non dowel-jointed, paid for by the square yard [SY].

This procedure creates settings in Contract S&T requirements that allows SM to do a better job of tracking aggregate sample requirements in real time. You will need to compute conversion factors to determine the TONS of aggregate in a SY of paving (of assumed thickness), and you will need to add material codes and S&T requirements to pay items that are currently set up as "nomats". You will also need to know how many sublots (number of samples) there will be for each of the Concrete Placement pay items.

Step 1: Starting with fine aggregate, compute the amount [TONS] of fine aggregate in a Square Yard [SY] of paving. Refer to step one of the QRG, "PC Paving - QC/QA - revising Contract S&T's";

- Assume a thickness
- Determine first how many CY of concrete is in a SY of paving.
- Multiply this number by the fine aggregate conversion factor (aggr054) from the CY pay item. (see screen shot of step 2 of this QRG)

This will result in a new conversion factor of fine aggregate in TONS per SY for the non-optimized concrete.

Step 2: Repeat this for coarse aggregate (aggr057).

Step 3: For the optimized gradation aggregate, we will use material code aggr080. Repeat step one except use the optimized gradation conversion factor, which is how many TONS of aggregate are in a CY of optimized concrete (from the mix design). Then determine TONS per SY.

Step 4: Add the two aggregate material codes (aggr054 and aggr057) to the PC Concrete placement pay item. Open the pay item, select the new icon and add the material code and the new conversion factor (**remember we are dealing in quantities per SY now**). Follow steps 8 - 11 outlined in alternative one of this QRG for each of the aggregates, adding all of the S&T requirements for aggregates. Be sure to use the correct number of sublots (samples) when computing frequency.

The screenshot shows a software interface for managing materials. The 'Materials' tab is selected. The following fields are visible:

- Contract:** 090182
- Project:** 1362606
- Bid Item Code:** 414(A) 0210
- Item Unit:** SY
- Desc. 1:** (SP)P.C.CONCRETE PAVEMENT(PLACEMENT)
- Desc. 2:**
- Supp Desc1:**
- Supp Desc2:**
- Material Code:**
- Conversion Factor:** .00000
- ☐ **Approved Source Required**
- Material Quantity:**
- Material Unit:**
- Special Instruction:**

Step 5: Add the aggregate material code aggr080 to the PC **Dowel-Jointed** Concrete placement pay item. Follow steps 8 - 11 outlined in alternative one of this QRG for the optimized aggregate, adding

all of the S&T requirements for aggregates. Be sure to use the correct number of sublots (samples) when computing frequency.

Step 6: Remove the aggregate testing requirements from the pay item, "PC Concrete for Pavement [CY]. Do this by going to each of the aggregate material codes in that item and changing the rate to zero on the second tab. Be sure to add a comment in the remarks bubble, ie: *7-20-09: Tracking aggr testing on the PC placement pay items. JSS.*

Step 7: Run the Sampling checklist process to update S&T requirements in the system. See the QRG, "Sampling Checklist".

NOTE: when creating sample records of these aggregates, use the frequencies computed above when filling in the Represented quantity field on the Contract Tab of the sample record. It is typically recommended to round this quantity **up** a little to ensure SM knows you have enough material sampled in case there are minor variations to the pay item quantity.