



NDOR SiteManager Materials Management

Standard Operating Procedures

Crushed Concrete for Foundation
Course

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Modification Tracking Summary

Summary of Changes	Date	Author
Standard Operating Procedures and Instructions document created	1/24/2012	Andi Clark
Updated Roles & Responsibilities	5/23/2012	Andi Clark
Added Sampling and testing requirements for version SLF005002, CCFC	9/6/2012	Andi Clark
Updated Soils Sampling Supervisor = Doug Churchwell	2/22/2013	Andi Clark

1. Introduction and Purpose:

This document is intended to be used in conjunction with the existing training materials provided by the NDOR (Nebraska Department of Roads), M&R (Materials & Research) Division.

1.1 Purpose:

The purpose of this document is to define the responsibilities of the inspection team during:

- Pre-placement
- Placement
- Post-placement

1.2 Roles and Responsibilities:

As of the publication date of this document, roles and responsibilities are defined as follows:

SiteManager Staff: 402.479.4760, DOR.SiteManagerMaterials@nebraska.gov.

Geotechnical Engineer: Mark Lindemann, 402.479.4752, Mark.Lindemann@nebraska.gov

Soils Survey Unit Supervisor: Doug Churchwell. 402.479.4678, Doug.Churchwell@nebraska.gov

1.3 Authentication:

NDR T 27, Sieve Analysis of Fine and Coarse Aggregates, <http://www.dor.state.ne.us/mat-n-tests/NDR%20Standard%20Test%20Methods/ndrt27.pdf>

AASHTO T 11, Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

Creating and Authorizing a Sample Record, http://www.dor.state.ne.us/mat-n-tests/pdfs-docs/Materials_Management_Guidance/Sitemanager/SOP_Creating_Authorizing_SiteManager_Sample_Record.pdf

NDOR Final Review Process Manual, [S:\Final Review Manual](#)

NDOR Materials Sampling Guide, <http://www.dor.state.ne.us/mat-n-tests/sampguide.htm>

NDOR Standard Specifications for Highway Construction, <http://www.nebraskatransportation.org/ref-man/specbook-2007.pdf>

NDOR Standard Test Methods Manual, <http://www.roads.nebraska.gov/mat-n-tests/NDR%20Standard%20Test%20Methods/index.pdf>

1.4 Abbreviations:

IA: Independent Assurance
MSG: NDOR Materials Sampling Guide
M&R: NDOR Materials & Research
NDOR: Nebraska Department of Roads
QA: Quality Assurance
RTF: Report Template Facility
SMGR: SiteManager

1.5 Definitions:

Verification: Results of a field performed gradation test for acceptance; a split companion sample has been sent to NDOR Central Laboratory for gradation verification (correlation) testing and aggregate quality testing for acceptance.

Field Acceptance: Results from field performed gradation tests for acceptance.

Re-Sample: Results from a new material sample obtained to replace the original sample.

Re-Test: Results from a second test portion, prepared from the same original sample to confirm the initial test results.

1.6 Material Codes:

The Material Code for Crushed Concrete for Foundation Course provided in this table is an integral link to the test methods. Additional information regarding the proper use of test methods is can be found in Section 3 of this document.

Test Method	Material Code	Material Full Name	Last Modified User ID	Last Modified Date
SLL001001	307CCFC	Crushed Concrete Foundation Course	DOR9077	20090820
SLF001001	307CCFC	Crushed Concrete Foundation Course	DOR9077	20090820
SLF005001	307CCFC	Crushed Concrete Foundation Course	DOR9026	20120322
SLF005002	307CCFC	Crushed Concrete Foundation Course	DOR9092	20120918

2. Pre-Placement:

2.1 Certification:

A sampler or tester shall be certified in accordance with the tester qualifications cited in the MSG. For more information, refer to Quality Assurance Program for Construction. Section 28, Appendix A, [NDOR Materials Sampling Guide](#)

3. Placement:

The construction inspection team is responsible for these activities:

3.1 Specification Requirements

Review and verify plans, specifications, special provisions, and MSG for project requirements. For more information, refer to [NDOR Materials Sampling Guide](#).

3.2 Material Requirements:

3.2.1 Field Sampling and Testing:

3.2.1.1 Acceptable Sample:

An acceptable sample consists of one unit of 50 pounds of crushed concrete material. The construction technician shall sample the material from the project grade pursuant to accepted sampling practices.

For more information, refer to [NDOR Materials Sampling Guide](#).

3.2.1.2 Frequency:

Verify sampling and testing frequency as required by MSG Section 12, Foundation Course (Crushed Concrete, Aggregate-D, and Bituminous).

Field personnel will test one 50-pound sample for each 500 cubic yards (or fraction thereof) of material. Further, field personnel will submit one 60-pound split sample for each 2500 cubic yards of material to the laboratory for gradation verification.

Material gradation will be accepted on a lot basis of 2500 cubic yards on the average of 5 consecutive tests, one for each 500 cubic yard subplot. If at the end of the project, the final lot consists of less than 2500 cubic yards, a minimum of 3 samples, or 1 sample for each 500 cubic yards or fraction thereof, whichever is greater shall be taken and tested and acceptance based on the average of those tests.

3.2.1.3 Sample Collection:

Sampling of material shall be conducted by field personnel from the project grade prior to spreading and trimming.

3.2.1.4 Sample Submission:

The sample submission is documented in SMGR. Samples are recorded in SMGR by their unique Sample Identification Number. For more information, refer to [Sample Identification Numbering Scheme](#).

Field personnel shall attach a sample ID card to samples submitted to the NDOR M&R central laboratory. The sample ID card shall include the Sample ID number and the representative test number. The test number can be found under Maintain Sample Information, Test tab. See Figure 1.

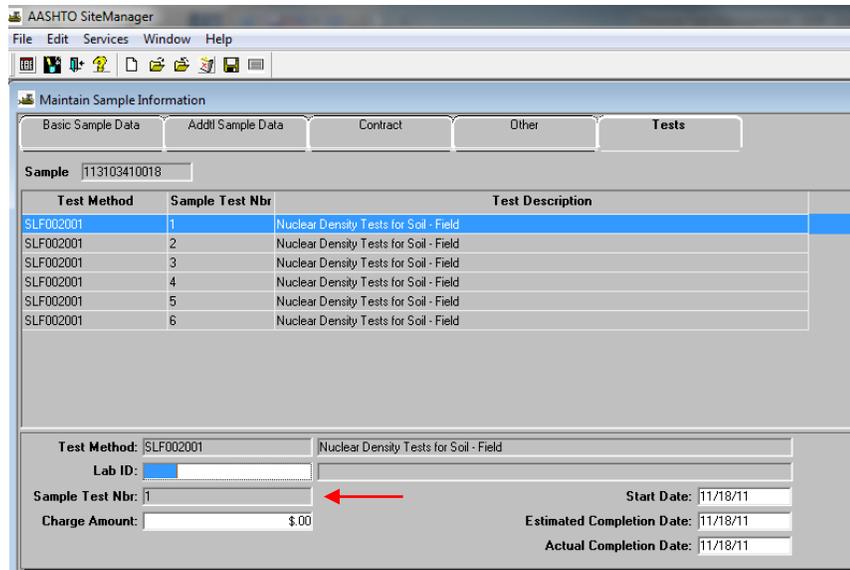


Figure 1, Maintain Sample Information, Test tab

The process to submit a sample is detailed further in previously published training materials. For more information, refer to [Creating and Authorizing SiteManager Samples](#).

3.2.1.5 Material Testing:

Sample material shall be washed in accordance with AASHTO T 11.
Material testing shall be conducted in accordance with NDR T 27.

3.2.2 Documentation:

3.2.2.1 Field Acceptance:

Field gradations will be identified as 'Field Acceptance' or 'Re-Test' (when not used for the purposes of verification by the NDOR M&R central laboratory).
All gradations are utilized in the calculation of the gradation average which is used for analysis during field acceptance.

3.2.2.2 Verification/Re-Sample:

As noted above, the split sample submitted to the NDOR M&R central laboratory for verification purposes will be identified with the Gradation Type of 'Verification'. See Figure 2.

The material gradation marked 'Verification' and the associated split sample will then be used by the NDOR M&R central laboratory to perform gradation verification.

If the gradation verification does not fall within the tolerance defined in AASHTO T 27, the NDOR M&R central laboratory personnel will notify both the sampler and QA Manager that an IA is required. The sampler will collect a new sample, split the sample, run the gradation in the presence of a QA Manager, in accordance with the procedure defined in section 3.2.1.4, and record the material gradation. The gradation type will be designated as 'Re-Sample'. The split sample will be sent to the NDOR M&R central laboratory for an additional gradation verification to ensure that the problem was resolved.

3.2.2.3 Crushed Concrete for Foundation Course, Field Performed Tests (Version SLF005001):

The data entry requirements for this test method were altered to better capture sampling data. This test template will be used on materials sampled until September 5, 2012.

Crushed Concrete for Foundation Course												
Field Performed Tests											Template ID: SLF005001 Version: 20120301	
NDOR M&R Mark Lindemann, Geotechnical Engineer												
Dry Wt of Smpl	Wash Test - Sieve Analysis Total Passing Percentage									Rep Matl Qty (cu yd)	Spacer Sieve Gradation Type	
	1 1/2	1 1/4	1	3/4	1/2	3/8	4	10	40			200
1.												<input type="checkbox"/>
2.												<input type="checkbox"/>
3.												<input type="checkbox"/>
4.												<input type="checkbox"/>
5.												<input type="checkbox"/>
Average												
	100			0/85				20/50				0/8

Crushed Concrete for Foundation Course
Material represented by samples that average 15% or more passing on the No.200 sieve will be subject to removal.

Gradation Type	
Field Acceptance	Results from field performed gradation tests for acceptance. A minimum of three samples is required for Field Acceptance.
Re-Sample	Results from a new material sample obtained to replace the original sample.
Re-Test	Results from a second test portion, prepared from the same original sample to confirm the initial test results.
Verification	Results of a field performed gradation test for acceptance; a split companion sample has been sent to NDOR Central Laboratory for gradation verification (correlation) testing and aggregate quality testing.

Note: Any sample record containing failing test results will require a description of the corrective action taken. The corrective action shall be documented in the Comments field.

Comments:

Test Specification: NDR T27

Figure 2, Crushed Concrete for Foundation Course, Field Performed Tests (Version SLF005001)

3.2.2.4 Crushed Concrete for Foundation Course, Field Performed Tests (Version SLF005002):

The data entry requirements for this test method were altered to better capture sampling data. This test template will be used on materials sampled after September 5, 2012.

Crushed Concrete for Foundation Course									
Field Performed Tests					Rep Mat Qty (cu yd)		Spacer Sieve Gradation Type		
NDOR M&R Mark Lindemann, Geotechnical Engineer		Wash Test - Sieve Analysis Total Passing Percentage			Template ID: SLF005002 Version: 20120905				
Dry Wt of Smpl	1 1/2	1 1/4	1	3/4	1/2	3/8	4	10	200
1.	Test Date / /	Station +	Offset (ft)						
2.	Test Date / /	Station +	Offset (ft)						
3.	Test Date / /	Station +	Offset (ft)						
4.	Test Date / /	Station +	Offset (ft)						
5.	Test Date / /	Station +	Offset (ft)						
Average	100	0/85	20/50		0/8				

Crushed Concrete for Foundation Course	
Material represented by samples that average 15% or more passing on the No.200 sieve will be subject to removal.	
Gradation Type	
Field Acceptance	Results from field performed gradation tests for acceptance. A minimum of three samples is required for Field Acceptance.
Re-Sample	Results from a new material sample obtained to replace the original sample.
Re-Test	Results from a second test portion, prepared from the same original sample to confirm the initial test results.
Verification	Results of a field performed gradation test for acceptance; a split companion sample has been sent to NDOR Central Laboratory for gradation verification (correlation) testing and aggregate quality testing.

Note: Any sample record containing failing test results will require a description of the corrective action taken. The corrective action shall be documented in the Comments field.

Comments: _____

Test Specification: NDR T27

Figure 3, Crushed Concrete for Foundation Course, Field Performed Tests (Version SLF005002)

3.2.3 Central Laboratory Testing:

3.2.3.1 Acceptable Sample:

An acceptable sample for gradation verification consists of one unit of 60 pounds of crushed concrete material. The split verification sample will be collected from the previously tested material pursuant to accepted sampling practices.

The split sample shall be delivered to the NDOR M&R central laboratory by the construction technicians in a canvas bag or clean five-gallon bucket. Material samples, accompanied by the proper SMGR Sample ID Cards, may be left on the NDOR M&R loading dock or delivered directly to the soils laboratory.

For more information, refer to [NDOR Materials Sampling Guide](#).

3.2.3.2 Frequency:

Verify sampling and testing frequency as required by MSG Section 12, Foundation Course (Crushed Concrete, Aggregate-D, and Bituminous).

Field personnel will provide one sample for each 2500 cubic yards (or fraction thereof) of material.

3.2.3.3 Sample Submission:

Sampling of material shall be conducted by field personnel from the project grade prior to spreading and trimming.

The sample submission will have been previously recorded in SMGR by field personnel.

3.2.3.4 Material Testing:

Verification material testing shall be conducted by NDOR M&R central laboratory personnel in accordance with NDR T 27 and AASHTO T 11.

The NDOR M&R central laboratory technician utilizes an off-application tool (excel spreadsheet) that compares the two sieve analyses to ensure compliance with the standard deviations provided in AASHTO T 27.

The process for authorizing this sample is detailed further in previously published training materials. For more information, refer to [Creating and Authorizing SiteManager Samples](#).

3.2.3.5 Material Testing – Re-Sample:

During the course of verification material testing, if a sample is found to be outside the range of acceptable tolerance, the NDOR M&R central laboratory manager will contact the QA manager to request IA (independent assurance) and additional material be provided for purposes of further verification material testing. This sample will conform to current standards for sample submission; the sample will be clearly designated as a Re-Sample on the SMGR test template.

3.2.3.6 Documentation:

NDOR M&R central laboratory personnel are required to test the verification sample(s) in accordance with accepted testing practices and document the findings in SMGR on the template Crushed Concrete for Foundation Course, SLL001001. See Figure 3.

Crushed Concrete for Foundation Course
Laboratory Performed Tests

NDOR M&R
Mark Lindemann, Geotechnical Engineer Template ID: SLL001001
Version: 20120301

Select Gradation Specification for Contract: *

Dry Weight of Sample	Wash Test - Sieve Analysis									
	Total Percent Passing									
	(Spacer Sieves Were Used)									
	1 1/2	1 1/4	1	3/4	1/2	3/8	4	10	40	200
Retained	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Passing %	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

IMPORTANT: Three gradation specifications exist for crushed concrete for foundation course. Refer to contract specifications to ensure the correct material is used.

* Spec	100	90/100	63/87	18/42	5/27	4/14	0/6	Let
* Spec 1	100	90/100	63/87	18/42	5/27	4/14	0/6	Let May 07 - Jul 08
* Spec 2	100		0/80	20/45			0/8	Let July 08 - Feb 12
* Spec 3	100		0/85	20/50			0/8	Let Feb 12 - present

Comments:

Test Specification: NDR T27

Figure 4, Crushed Concrete for Foundation Course, Laboratory Performed Tests

3.2.3.7 Reporting:

SMGR provides reporting options that will compile the test results and present them in RTF format.

The reports that are connected to this material include:

- SLF0001, SOIL: Contract Summary-Field Grad-Crushed Concrete - Spec 1
- SLF0002, SOIL: Contract Summary-Field Grad-Crushed Concrete - Spec 2
- SOIL: Contract Summary-Field Grad-Crushed Concrete - Spec 3 ~ **Coming Soon!**
- SLF0003, SOIL: P/S Summary-Field Gradations-Crushed Concrete - Spec 1
- SLF0004, SOIL: P/S Summary-Field Gradations-Crushed Concrete - Spec 2
- SOIL: P/S Summary-Field Gradations-Crushed Concrete - Spec 3 3 ~ **Coming Soon!**
- SLL00001, SOIL: Contract Summary-Central Lab-Crushed Concrete - Spec 1
- SLL00002, SOIL: Contract Summary-Central Lab-Crushed Concrete - Spec 2
- SOIL: Contract Summary-Central Lab-Crushed Concrete - Spec 3 ~ **Coming Soon!**
- SLL00003, SOIL: P/S Summary-Central Lab-Crushed Concrete - Spec 1
- SLL00004, SOIL: P/S Summary-Central Lab-Crushed Concrete - Spec 2
- SOIL: P/S Summary-Central Lab-Crushed Concrete - Spec 3 ~ **Coming Soon!**
- SLX00001, SOIL: Contract Summary-Verification – Crushed Concrete

For more information, refer to [Generate an RTF Report](#).

4. Post-Placement:

4.1 Final Review Process:

NDOR will follow operating procedures defined in the NDOR M&R Final Review Process Manual located at [S:\NDOR M&R Final Review Manual](#).