Materials Procedures Committee Regular Meeting

Meeting Time/Date: September 18th, 10:00 AM

Meeting Location: MCS&T (Conference Rm.) - 190 Dry Branch Drive, Charleston, WV 25306
Charleston WV, 25301

Online Meeting: Google Meet Video Conference

Online Link - (https://meet.google.com/apa-rvti-ndx?authuser=0)

Files Available on ProjectWise for DOT users – See Invite or Follow P/W path:

WVDOH ORGS\MCS&T (0077) - FM\Materials Procedure Committee\MP Committee Meeting Files\2024\2024 09 18 MP Meeting

Files Available on Webpage:

https://transportation.wv.gov/highways/mcst/Pages/MP-Committee-Page.aspx

Materials Procedures – Approved at Last Meeting

1. 106.00.05 – Acceptance of Materials Via the Approved Product List
2. 601.03.50 – Guide for Quality Control and Acceptance Requirements for Portland Cement Concrete
3. 604.02.40 – Inspection and Acceptance Procedures for Precast Concrete Products
4. 714.03.30 – Quality Assurance of Reinforced Concrete Culver, Storm Drain and Sewer Pipe
5. 603.10.40 – Inspection and Acceptance Procedures for Prestressed Concrete Bridge Members
6. 717.04.21 – Guide for Quality Control of Compaction
7. 700.00.30 - Certification of Batch Scales and Calibration of Standard 50 Pound Test Weights

Materials Procedures - Old Business

Number	Champion	Title	Description
1* - 700.00.53	Brayack	Procedure for the Independent Assurance Program	Major Re-Write based on FHWA guidance
2* - QC MPs	Brayack	QC MPs	Removes Industry testers list from QC.
3& - 106.03.50	Harper	General Information Guide for Technician and Inspector Certification Program (TICP)	General Updates including Cert Board, and update of new classes. Removal and incorporation of handbook
4& -106.10.50	Brayack	WVDOH Buy America Acceptance Guidelines	Removes waiver for Manufactured Materials in anticipation of FHWA Update.
5* - 106.10.51	Brayack	WVDOH Buy America Waiver Guidelines	Splitting out from 106.10.50 due to length and complexity. Outlines waiver process for Buy America Materials. Pending incorporation of updates from FHWA

Materials Procedures – Editorial Edits

1* - 601.03.50	Brayack	Guide for Quality Control and Acceptance Requirements for Portland Cement Concrete	Attachment 1, page 3, conversion typo
2* - 604.02.40	Thaxton	Inspection and Acceptance Procedures for Precast Concrete Products	Harmonization

Materials Procedures - New Business with Significant or Process Updates

1& - 603.10.40	Thaxton	Inspection and Acceptance Procedures for Prestressed Concrete Bridge Members	Add E-Ticketing
2& - 720.10.01	Allison	Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement	Minor Updates/Reconfirmation
3& - 700.04.22	Whelan	Method for Approving Devices Used for Testing Density and/or Moisture Content of In-Place Material	Process for creating approved list for Density/Moisture Devices
4& - 700.00.54	Brayack	Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results	Modernization/Update of MP.
5& - 106.03.51	Harper	Policy for Materials Certification Reciprocity	Adds PCC technician reciprocity.

Note 1: * Denotes this MP is up for Vote

Note 2: & Denotes this MP is not up for Vote

Comments

Comments due September 17th, so the Champion may review and address them. Submit comments to Adam Nester (Adam.W.Nester@wv.gov)

Next Meeting

New or Updated MPs due to the MP Chair 2-weeks before the next meeting: October 2nd

Meeting Time/Date: 10:00 AM, October 16, 2024

Meeting Location: MCS&T Conference Room

Online Meeting: Google Meet Video Conference (Link TBD)

Additional MP Committee Meeting Information

For details of previous meetings, please visit the MCST MP Committee Webpage https://transportation.wv.gov/highways/mcst/Pages/MP-Committee-Page.aspx

Tentative MP Committee Dates for 2024:

November 20, December 18

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR THE INDEPENDENT ASSURANCE PROGRAM

1. PURPOSE

1.1 To provide a procedure for meeting FHWA's requirements for the Independent Assurance (IA) program.

2. SCOPE

2.1 This procedure applies to the following materials:

2.1.1 Aggregate

2.1.2 Asphalt

2.1.3 Portland Cement Concrete (PCC)

2.1.4 Compacted Soil, Aggregate and Asphalt Materials

2.1.4.1 The WVDOH is in the process of evaluating the method to incorporate this testing into the IA program.

3. REFERENCED DOCUMENTS

3.1 Office of Pavement Technology Publication No. FHWA-HIF-12-001[1], October 2011. Included as Attachment 2.

3.2 23 CFR - PART 637—CONSTRUCTION INSPECTION AND APPROVAL[2]

~~3.2~~3.3 MP 106.03.50 - General Information Guide for Technician and Inspector Certification Program (TICP)

~~3.3 MP 700.00.56 Testing Procedures for Independent Assurance Sampling.~~

4. DEFINITIONS

4.1 QA – Quality Assurance – The division sample used for the acceptance of material on a project.

4.2 IA Sampler: The employee at MCS&T Division who oversees the IA program. This person may perform 1:X testing when the population (X) is not large enough to compare samples statistically. The IA Sampler may, at the discretion of the Director of MCS&T delegate this task to a qualified Division employee.

4.3 Evaluation Period: The calendar year in which the IA program is evaluated. This begins on January 1st and ends on December 31st of the same year.

4.4 IA Material: Each unique material that is evaluated by the IA program.

4.5 QA Technician: Each technician who tests for QA, an IA Material during the Evaluation Period.

~~4.1~~4.6 IA Test Equipment – Each primary piece of equipment that is used to test an IA material during the Evaluation Period. This equipment is noted in the respective sections of this document.

~~4.2~~4.7 Proficiency Sample: A single (homogeneous) sample that is distributed by an agency or designated agent to be tested at multiple laboratories. The distributing agency will provide a "score", statistically comparing results amongst the laboratories.

4.8 AASHTO re:source[3]: A technical services program that provides resources for construction materials testing laboratories. It's part of the American Association of State Highway and Transportation Officials (AASHTO), a nonprofit organization that sets technical standards for highway systems and acts as a liaison between state and federal transportation departments.

~~4.3~~4.9 Satisfactory Evaluation: If the results of a test fall within the guidelines established in Section 12 of this document, the test will be considered satisfactory.

~~4.4~~4.10 Non-Satisfactory Evaluation: If the results of a test do not fall within the guidelines established in ~~Section 11 of~~ this document, the test will be considered non-satisfactory.

[1] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf
[2] https://www.ecfr.gov/current/title-23/chapter-I/subchapter-G/part-637
[3] https://aashtoresource.org/

4.54.11 Corrective Action Report (CAR): An action report identifying the probable source of a Non-Satisfactory Evaluation. This report identifies the non-conformance, explains issues which lead to this non-conformance, and explains corrective actions to address this non-conformance.

5. SYSTEM APPROACH FOR IA SAMPLING AND TESTING

5.1 The WVDOH IA program shall operate under the system approach as described in Office of Pavement Technology Publication No. FHWA-HIF-12-001.

5.2 Each IA test equipment and each QA technician shall be evaluated. Redundant testing shall be avoided unless a failure or faulty testing is reported during the testing.

5.2.1 If a technician is testing and the equipment fails, they shall complete the test on another piece of equipment. If this occurs, it shall be noted in a corrective action report.

5.15.3 The goal of the IA program is to meet a 90% evaluation threshold for each ~~IA~~ QA ~~tester~~ technician and IA test equipment. Each of these entities is considered separate and independent of each other.

5.3.1 ~~IA~~ QA ~~tester~~ technicians shall be evaluated for each unique IA material they test during the evaluation period. If a person tests multiple IA materials during the evaluation period, the will be required to be evaluated for each material independently.

5.3.2 The evaluation for tests is described in Section 12 of this document.

5.4 If the 90% evaluation threshold is not met, a corrective action summary shall be included in the IA report.

~~5.2~~

6. POPULATION OF QUALITY ASSURANCE TESTERS AND EQUIPMENT

6.1 Once per year, before any work is performed by District Technicians, a signed letter stating the names of each of their quality assurance testers shall be submitted by the District Construction Engineer to the Director of MCS&T. In lieu of this letter, Districts may utilize ~~a~~an MCS&T provided online form.

6.2 If, during the calendar year, additional testers are added to the District's roster, the Construction Engineer shall submit an amended list to the Director of MCS&T. This shall be done before any quality assurance work is performed by the technician.

6.3 In the event where a project incorporates non-DOH acceptance testers, the District Construction Engineer shall submit to the Director of MCS&T a signed letter stating the names of each of the quality assurance testers. As part of their duties, this person must participate in the IA program for each evaluation period.

7. PORTLAND CEMENT CONCRETE

7.1 Each QA technician who tests Portland Cement Concrete during the evaluation period shall perform an IA test corresponding to the test they performed during that evaluation period.

7.2 The IA frequency goal for each tester and ~~each piece of testing~~primary equipment is as follows:

PCC IA Samples Frequency	
Air – AASHTO T 152	1/Year
Compressive Strength Testing - AASHTO T 22	1 Set/Year
Slump – AASHTO T119	1/Year

7.3 For Portland Cement Concrete, the Division will host at least one in-house proficiency style test of concrete. This event shall be a group event where concrete is provided, and each QA technician is present. The QA technician will test the material using the equipment they typically use to test concrete.

7.4 Plastic Concrete Testing:

7.4.1 For plastic concrete testing, each QA technician, their testing equipment, as well as their results shall be recorded.

7.4.2 During this event, the IA sampler as well as representatives from MCS&T will observe the QA technicians to ensure proper testing procedures are followed.

7.4.3 If a QA technician is observed deviating significantly from testing procedures, the IA sampler or their representative may fail the technician, regardless of the technician's results. In this case, the test shall be considered a failure and require a CAR. Also, their results shall be discarded from the population of results.

7.5 Cylinder Testing:

7.5.1 At this event, a standard set of 4x8 cylinders shall be created for each QA technician who performs the T22 test in each District. If present, this set of cylinders shall be fabricated by a technician from that District. If a District has more than 1 QA technician or more than 1 set of testing equipment, additional sets of cylinders shall be fabricated for each instance.

7.5.2 If a District does not attend, a set of cylinders shall be fabricated for them. This set of cylinders will be tested by that District but will only be considered a "back-up" case if the District cannot attend another session.

7.5.3 The fabricator and testing equipment shall be noted for cylinder testing.

7.5.4 Upon testing of the cylinders, the tester, testing equipment and results shall be documented and sent to the IA sampler.

7.6 For Portland Cement Concrete the IA testing equipment is as follows:

1. Compressive Strength Testing Machine
2. Type B Pressure Meter
3. Slump Cone

~~7.3 The evaluation of these tests shall be described in Section 11 of this document.~~

8. SUPERPAVE ASPHALT CONCRETE

8.1 Each QA technician who tests SuperPave Asphalt Concrete during the evaluation period shall perform an IA test corresponding to the test they performed during that evaluation period.

~~8.1~~8.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

SuperPave IA Samples	
Air Voids - AASHTO T 269	1/year
Asphalt Content by Ignition - AASHTO T308	1/year
Bulk Specific Gravity, Vacuum - AASHTO T331	1/year
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Maximum Specific Gravity - AASHTO T209	1/year
Percent Passing the #200 Sieve - AASHTO T30	1/year

8.3 Each technician shall participate in the AASHTO re:source proficiency program for SuperPave Asphalt Material. This shall apply to all of the above listed tests.

8.4 If a District has multiple employees are testing equipment, they shall request additional samples to ensure that all QA testing technicians and equipment are evaluated.

8.5 Burn-Off:

8.5.1 Since most District operate multiple burn-off ovens, MCS&T shall obtain and distribute a split sample for each of the District's burn-off ovens. The QA technician, the testing equipment as well as the results shall be documented and sent to the IA Sampler.

8.6 For SuperPave Asphalt Concrete the IA testing equipment is as follows:

1. Gyratory Compactor
2. Core Lok - Asphalt Density Measurement System
3. Burn-Off Oven

Commented [DB1]: We will still evaluate this on the proficiency sample, we'll consider the burn-off later in the section to be an additional layer.

Commented [DB2]: Burn-Off is the same for both SuperPave and Marshall, so we're only listing it in this section.

9. MARSHALL ASPHALT CONCRETE

9.1 Each QA technician who tests Marshall Asphalt Concrete during the evaluation period shall perform an IA test corresponding to the test they performed during that evaluation period.

~~9.1~~9.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Marshall IA Samples	
~~Asphalt Content by Ignition - AASHTO T308~~	~~1/year~~
Bulk Specific Gravity, SSD - AASHTO T166	1/year
Marshall Stability/Flow - AASHTO T245	1/year
Maximum Specific Gravity - AASHTO T209	1/year
~~Percent Passing the #200 Sieve - AASHTO T30~~	~~1/year~~

9.3 Each technician shall participate in the AASHTO re:source proficiency program for SuperPave Asphalt Material. This shall apply to all the above listed tests.

9.4 If a District has multiple employees are testing equipment, they shall request additional samples to ensure that all QA testing technicians and equipment are evaluated.

9.5 For Marshall Asphalt Concrete the IA testing equipment is as follows:

1. Marshall Hammer
2. Marshall Stabilometer.

~~9.2 The evaluation of these tests shall be described in Section 11 of this document.~~

10. AGGREGATE GRADATION

10.1 Each QA technician who tests Aggregate during the evaluation period shall perform an IA test corresponding to the test they performed during that evaluation period.

~~10.1~~10.2 The IA frequency goal for each tester and each piece of testing equipment is as follows:

Aggregate Gradation Samples	
#8, Class 1~~,~~3 ~~,~~or Class 10	1/year

~~10.2~~10.3 ~~The following sieves will be evaluated:~~ All spec sieves will be evaluated for the material. For the re:source sample, all scored sieves will be evaluated.

~~1. 1.5" Sieve (40 mm)~~
~~2. ¾" Sieve (20 mm)~~
~~3. #4 Sieve~~
~~4. #40 Sieve~~
~~5. #200 Sieve~~

10.4 Each technician shall participate in the AASHTO re:source proficiency program for SuperPave Asphalt Material. This shall apply to all the above listed tests.

10.5 If a District has multiple employees are testing equipment, they shall request additional samples to ensure that all QA testing technicians and equipment are evaluated.

10.6 Since most District operate shakers, MCS&T shall obtain and distribute a split sample for each of the District's gradation machines that were used during the evaluation period. The QA technician, the testing equipment as well as the results shall be documented and sent to the IA Sampler.

10.7 For Aggregate Gradations the IA testing equipment is as follows:

1. Aggregate Shaker

~~10.3 The evaluation of these tests shall be described in Section 11 of this document.~~

11. COMPACTION

11.1 The WVDOH is currently evaluating the process of adding Asphalt and/or Aggregate/Soil Compaction to the IA program. The goal is to add this to the program for the 2025 evaluation period.

12. EVALUATION PROCEDURE

12.1 Samples will be evaluated statistically when the population of results is 5 or greater. If the sample is not provided by AASHTO re:source, they will be evaluated by the WVDOH IA sampler. ~~A sample that falls within 2 standard deviations of the population will be considered satisfactory~~The calculation method used by ASHTO re:source shall be followed. The calculation method is shown in Attachment 3.

12.2 If the samples are provided by AASHTO re:source a rating of 3, 4, 5 as assigned by the testing agency shall be considered satisfactory.

12.3 In the event where the population is less than 5, samples will be evaluated by averaging the tests results and using the respective AASHTO Precision and Bias Table as the acceptable range of values.

12.3.1 For example, if the average is 5.0 and the table provides a precision and biased of 1.2, the test values must fall between 3.8 and 6.2 to be considered satisfactory.

~~12.4 For Portland Cement Concrete, the acceptable range for the average of all results is as follows:~~

~~12.5 Slump: +/- 1.5 in (40 mm)~~

~~12.6 Air: +/- 1.5 in (40 mm)~~

~~12.7 Cylinders: +/- 10%~~

~~12.8~~

~~12.9~~12.4 If the results of an evaluation are satisfactory, the evaluation will be considered successful. A successful evaluation will verify both the ~~Active~~ QA ~~Tester~~ Technician and the IA ~~Active T~~testing ~~Equipment~~ equipment used during the material test.

12.5 If the results of an evaluation are deemed non-satisfactory, the material test will be reviewed by the respective District Materials Supervisor. Within 30 days of notification, the District Construction Engineer shall submit a corrective action report to the Director of Materials Control Soils and Testing Division. This Corrective Action Report will be included in the yearly IA report. A sample of this Corrective Action Report is provided in Attachment 1. The live version of the file is in the WVDOH MCS&T Toolbox[4].

12.6 The acceptance criteria shall be evaluated every three years. The most recent evaluation of this criterion was on :

_____ by _____ (Director of MCS&T)**.

[4] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

** Note: This document shall be effective as per the signature date at the end of this document. However, the live version of this document will be updated as indicated above. This review date will not affect the signature nor effective date of the procedure, but rather provide documentation of WVDOH's compliance with Federal guidelines.

13. RECIPROCITY OF IA TESTING AND TECHNICIAN CERTIFICATION.

13.1 Given that the practical portion of the technician certification program (as described in MP 106.03.50) is equivalent to that of an IA sample, reciprocity between these tests can be applied by the respective program administrator.

13.2 At the discretion of the Technician Certification and Training Coordinator, a successful IA sample may be considered the "Practical" portion of a technician's certification or recertification for the respective material.

13.3 At the discretion of the IA sampler, the practical portion of either a certification or recertification may be considered a successful IA sample.

~~12.9.1 If a Concrete Slump and Air IA test is determined to be non-satisfactory, the IA sampler shall perform another 1-1 test with the testing technician to determine the root cause. The IA sampler may have the technician use either the IA testing equipment or another previously satisfactory test equipment to isolate the issue.~~

~~12.9.2 If the Technician is determined to be satisfactory using another piece of equipment, the IA sampler shall perform additional testing with the errant devices to determine if the testing equipment is the root cause of the unsatisfactory result.~~

~~12.9.3 In the above-described instance, all pertinent information shall be provided in a corrective action report.~~

~~13.~~14. REPORTING

~~13.1~~14.1 The evaluation period shall be the calendar year, starting with January 1st and ending December 31st.

~~13.2~~14.2 The annual I.A. report shall be submitted to FHWA. The due date for the report is April 1st of the year proceeding the evaluation period.

_____
Michael A Mance, PE
Interim Director
Materials Control, Soils & Testing Division

MP 700.00.53 Steward – Materials Control Section
MAM:B
ATTACHMENTS

Attachment 1: Sample Corrective Action Report

WVDOH Independent Assurance Corrective Action Report		
	Form 2024-IA-CAR	
Date of Occurrence:		
Date Submitted:		
Name of Tester:		
Testing Equipment:		
Material Tested:		
Describe the issue reported:		
What was the root cause of the issue?		
What actions have been done to correct this issue?		
Signature of Testing Technician		
Signature of District Materials Supervisor		
Signature of District Construction Engineer	Review: MCST	

Attachment 2: Office of Pavement Technology Publication No. FHWA-HIF-12-001[5], October 2011.

[5] https://www.fhwa.dot.gov/pavement/materials/hif12001.pdf

Corrective Action Report

WVDOH Independent Assurance Corrective Action Report		
Form 2024-IA-CAR		
Date of Occurrence:		
Date Submitted:		
Name of Tester:		
Testing Equipment:		
Material Tested:		
Describe the issue reported:		
What was the root cause of the issue?		
What actions have been done to correct this issue?		
Signature of Testing Technician		
Signature of District Materials Supervisor		
Signature of District Construction Engineer	Review: MCST	

TechBrief

The Construction and Materials Quality Assurance Program is an integrated, national effort to improve the effectiveness of the State acceptance of materials both in the inspection, sampling and testing. The program is designed to provide tools and guidance in implementing Quality Assurance programs. The program is designed to provide tools and guidance in implementing Quality Assurance programs.

U.S. Department of Transportation
Federal Highway Administration

Office of Pavement Technology

Publication No.
FHWA-HIF-12-001

October 2011

INDEPENDENT ASSURANCE PROGRAMS

This Technical Brief provides information regarding independent assurance as it relates to activities for the evaluation of the sampling and testing procedures used in a materials and quality acceptance program.

Introduction

23 CFR 637 defines an Independent Assurance Program as: Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program.

An Independent Assurance Program ensures the sampling and testing is performed correctly and the testing equipment used in the program is operating correctly and remains calibrated. It involves a separate and distinct schedule of sampling, testing and observation.

Qualified sampling and testing personnel, other than those performing the verification and quality control (QC) sampling and testing, should perform the Independent Assurance (IA) tests. Likewise, equipment other than that used for verification and QC should be used for IA sampling and testing. By regulation IA sampling and testing is conducted by agency personnel or an accredited laboratory designated by the agency.

The regulation requires IA specifically be designed to include testing performed on project produced materials. Since the testing of project produced materials are tested in multiple locations and by multiple personnel it is necessary to have some assurance the testing is being performed accurately. Manufactured products are typically tested in the State's central laboratory or by a designated consultant laboratory. Testing in the central laboratory is considered to be covered by the laboratories accreditation and participation in proficiency testing.

Background

In the early sixties Congressional investigation uncovered improper testing and fraud in some of the federally funded highway projects. To address the issue of improper testing a separate sampling and testing program was developed. The program was operated by personnel different than project personnel on different equipment. The samples were split with project personnel and the test results were compared. In addition, testing procedures were also observed. This was done to ensure sampling procedures were performed correctly and equipment stayed in calibration. In later rewrites of the regulation this program became the Independent Assurance program.

Scope

The regulation, 23 CFR 637, only covers projects that are on the National Highway System (NHS). The regulation requires testing personnel that perform any verification testing or QC testing used in the acceptance decision be covered by an IA program regardless of the agency, including a local agency or a toll authority administering a project.

Some States have IA testing personnel perform other duties such as: (1) instructing other testers, (2) obtaining samples for the verification of manufactured products,(3) obtaining samples of aggregate, cement, binder samples at production facilities for purposes other than IA, (4) inspecting precast or other facilities. Even though these functions are a necessary part of an overall Quality Assurance (QA) program they will not be discussed in this Tech Brief since the purpose of this Tech Brief is to discuss the IA functions as defined in the regulation.

Regulation 23 CFR 637

The text of the entire regulation can be found at this website:
http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html

The following is a summary of the elements of the IA program:

1. Establish IA sampling and testing frequencies;
2. Evaluate testing equipment by using one or more of the following: calibration checks, split samples, or proficiency samples.
3. Evaluate testing personnel by observations and results from testing split samples or proficiency samples.
4. Prompt comparison and documentation of test results obtained by the tester being evaluated and the IA tester.
5. Develop guidelines including tolerance limits for the comparison of test results.

6. Provide an annual report to the FHWA when the system approach is used.

The rest of the Tech Brief will discuss best practices for each of the above requirements.

System versus Project Approach

The Independent Assurance Program can be set up on a project basis, which is the traditional approach, or on a system basis. The difference in the two approaches is the basis of the frequency of testing (cover all projects versus cover all personnel).

Some States have moved away from having testing personnel on all projects and are moving toward centralizing testing away from the project level. As this occurs testers may perform testing on several projects and it becomes more efficient to have a frequency based on the testers instead of projects quantities. In addition, the project approach does not always include all the testing personnel.

As States have moved toward the system approach they have also incorporated the IA program results as part of the technician qualification program.

Frequency of Independent Assurance Testing

Project Approach - The State establishes the frequency for the IA testing based on the testing frequency performed on the project or on a time frequency on a project. Typically, the States use a frequency of 10 percent of the verification/acceptance testing. For example if the verification testing is performed at the rate of 1 per 500 tons the IA frequency would be 1 per 5000 tons.

System Approach - An alternative method to basing frequency on project testing frequencies is to base the IA frequency on a time basis for all testers and equipment. In this case, the personnel and equipment would be verified on a "system" basis. The purpose is to cover all the testers and equipment over a period of a year. While States strive to reach all testers, it is not always possible. States typically set a goal of reaching 90% of the active testers. Active testers are defined as those testers that are performing testing in a given year, in most States this is a subset that is smaller than all “qualified” testers since some qualified personnel may have retired, move to other jobs or resigned. The system approach can be a more effective means of performing IA since it ensures that most testers are reviewed and that the same testers are not continually reviewed.

One challenge is to determine the active testers. For States that have an electronic materials management system it is very easy to determine the active testers since these systems indicate who is performing a given test. The IA testers will run reports periodically (monthly) to

determine the testers that need to be reviewed. For those States that do not have an electronic materials management system it becomes more challenging to determine the active testers. A good practice under these circumstances is to require the project personnel to identify the personnel that are going to perform testing, state, consultant, and contractor, at the beginning of the project along with any changes to the IA personnel. The IA testers will then know the active testers along with the testers that they have already been reviewed and will thus know the testers that need to be reviewed in the future.

Mixed Approach - It is permissible to separate the verification of equipment and personnel, i.e., one method to check equipment is to require a calibration and inspection frequency. Personnel can be checked by sending out proficiency samples. It is permissible to use a mixed approach, i.e. where some test procedures and or some testers are covered by a project approach where the remaining procedures are covered by a system approach.

Equipment and Personnel

Testing equipment may be evaluated by using one or more of the following: calibration checks, split samples, or proficiency samples.

Testing personnel may be evaluated by observations and split samples or proficiency samples.

The typical approach for performing IA is to check equipment and personnel at the same time. This is performed by IA personnel visiting a job site to observe the sampling and testing on site and to also test a split of the sample on site with equipment the IA personnel brought or to take the split to another laboratory for testing. When the test results are compared it checks both the equipment and tester. If a set of samples do not compare further analysis is required to determine if the source of the error is in procedure or equipment.

Some States send out proficiency samples to district, other subsidiary laboratories as well as consultants and contractors. Some of these States develop their own samples, while others require the laboratories to subscribe to the AASHTO Materials Reference proficiency samples. Proficiency samples are a way to address equipment and test procedures. Some States are preparing enough proficiency samples for all the active testers. In cases where all the testers are covered by the proficiency samples additional IA work would only need to review those that did not compare. If the proficiency program did not cover all the testers additional IA work would also be required.

Another method that covers just the equipment is performed by frequent standardization and or calibration. The frequency for standardization and/or calibration differs by equipment due to the unique nature of each testing device. AASHTO R-18 and some of the test procedures contain a frequency for standardization/calibration of the testing equipment. However, if standardization/calibration is the only check on the equipment (no split samples or proficiency samples) the standardization/calibration should probably be run frequently.

As some States move toward the system approach the States are checking testers in a central location. This allows the IA inspectors to cover numerous testers at one time. This has worked especially effectively in States where the projects and or laboratories are spread across a large geographic area. The States that use this approach are also including this data for requalification of testing personnel. When this approach is used the equipment needs to also be covered by standardization/calibration, split sample or proficiency sample testing.

Some States will suspend and/or revoke a technician's qualification/certification for repeated poor performance on IA evaluations. These are in addition to suspensions and/or revocation due to fraudulent activities. Some States will also perform testing on 3 way split-samples. In this approach one split is tested by project personnel, one split is tested by the contractor personnel and the third split is tested by the IA personnel. This is typically performed at the beginning of production to ensure that all testing personnel and equipment are performing correctly.

Prompt Comparison and Documentation

It is essential the IA Program compare results and detect deficiencies in State or contractor testing procedures in a timely manner. This improves the reliability of sampling and testing. The timely comparison of data may be restricted by the resources of an agency including personnel, facilities, and geographical constraints. These resource needs must be considered in an agency program.

Deviations from the established tolerances will require an engineering audit of the respective sampling and testing procedures, and the equipment used. When comparison of QC and verification data reveals significant differences in test values, the variables involved should be evaluated by the IA personnel to determine whether further testing and investigation is needed to establish the source of the discrepancy.

Corrective actions should be incorporated as appropriate under the direction of IA personnel.

Tolerances for Comparison of Test Results

A common place to start in establishing comparison tolerances are the D2S limits in the published test procedures. However, as States reduce the options in published test procedures and as testers become more proficient, the tolerances should be reduced. When split samples are used, the materials and sampling variability are eliminated from the analysis and only the variability due to the testing procedures and the equipment are included.

The comparison of split sample test results should be based on established deviation values or tolerances that are representative of the testing procedures and materials used. AASHTO and ASTM have published precision statements for some test methods. However, many of these procedures have multiple methods and or options inside the procedure. In order to reduce

testing variability most States have specified the particular options within the test procedures. Therefore the agency should develop Independent Assurance tolerances based on their specific options that the State is requiring. Care must be taken when historical data are used in establishing theses limits to ascertain that the data are not biased; i.e., they were obtained in a random manner and that all test results have been reported. Otherwise, the variability may be underestimated and the limits too restrictive.

Many States distribute proficiency samples to their district laboratories. This data can be analyzed to determine IA tolerances. The formula for D2S is $D2S = 2\sqrt{2}(1S)$ where

$1S = the\ standard\ deviation\ of\ the\ results$.

Established tolerances should be periodically evaluated and modified to ensure that the goals of IA are being met; that is, it assures the reliability of contractor and agency test results. Some States are evaluating their tolerance every year. As a minimum the tolerances should be evaluated every 5 years.

In situations where multiple split tests are performed on a project a paired t-test can also be used to analyze data.

Annual Reports

The regulation requires those States that use a system approach to prepare and submit an annual report to the FHWA Division Office.

The annual report should include the following information: the number of certified technicians, the number of active technicians, the number of technicians covered by the IA program, the number of IA reports that had deviations, and a summary of how the deviations were addressed along with the potential systematic solutions to reoccurring deficiencies.

Alternate Approach

One State is statistically analyzing State and Contractor data in an innovative manner to accomplish both verification and IA.

An example of this approach is shown in Figure 1. In this approach the contractor performs sampling and testing at the rate of 4 samples per lot. The State takes verification samples, at the beginning of production; a minimum of 4 samples are taken the first week of production and at least 1 per lot. The State's verification samples are taken at the plant by contractor personnel under the direction of the State personnel. The verification samples are split and one split is given to the contractor. Analysis is performed in two ways. First, for IA, the split results are compared using IA comparison tolerances. In the figure below; IA1 is compared to the contractor split of that sample, sample 4 of lot 1. For validation, the State verification

samples are made independent by removing the corresponding contractor splits. In the figure below samples 1, 2, 3 from lot 1; samples 1, 2, 4 from lot 2; samples 1, 2, 3 from lot 3; and samples 1, 3, 4 from lot 4 are compared to the State's IA1, IA2, IA3, and IA4 with the F& t tests.

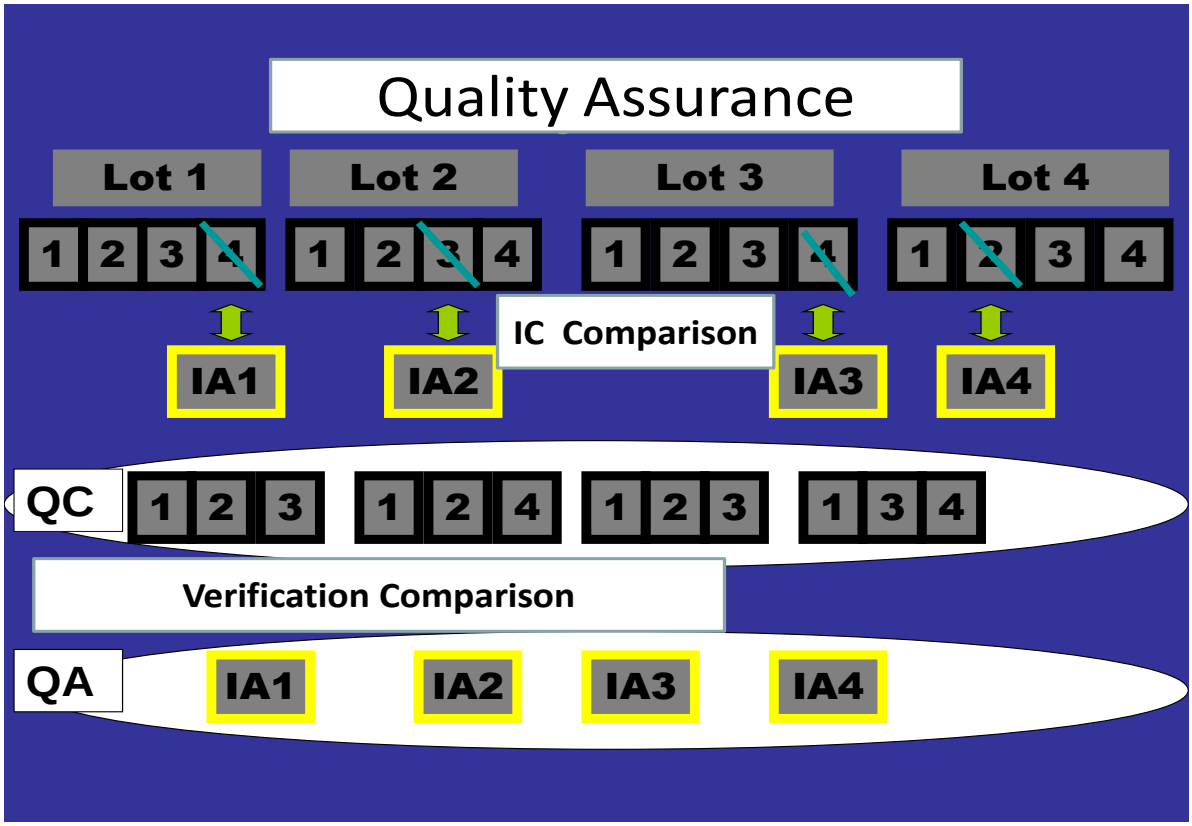

Figure 1. Example of Alternate Approach.

Conclusion - Commonly Noted Areas of Concern

- Test results from the IA program should only be compared to split test results or results from others testing the same set of proficiency samples.
- IA results are not to be used in the acceptance decision.
- IA should be based on split samples or proficiency samples not independent samples so that data can be compared without material variability.
- All tests that are performed in the field to determine the final acceptability of the materials should be covered by the IA program.

- All technicians that are performing testing that is used in the acceptance decision need to be covered by the IA program.
- Observation of sampling and testing procedures should be included as part of an IA system to evaluate sampling and testing personnel and ensure that testing and sampling procedures are performed correctly.

Further Information:

- "23 CFR Part 637," Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration, *Federal Register*, Washington, DC published on June 29, 1995, and amended on December 10, 2002, and September 24, 2007, http://www.access.gpo.gov/nara/cfr/waisidx_03/23cfr637_03.html
- Non-regulatory supplement for 23 CFR Part 637, Subpart B - Quality Assurance Procedures for Construction, Federal Highway Administration. The non-regulatory supplement was updated on July 19, 2006. http://www.fhwa.dot.gov/legsregs/directives/fapg/0637bsup.htm
- Frequently asked questions (FAQ) on the Quality Assurance Regulation. The FAQs were updated on November 26, 2006. http://www.fhwa.dot.gov/pavement/materials/matnote11.cfm - qaa
- AASHTO Standard Practice R 44, “Independent Assurance Programs” has been published in the 2007 AASHTO Standards. This guide will assist the States in developing Independent Assurance Programs
- NHI Course 134042, “Materials Control and Acceptance –Quality Assurance.” The course is four days long and covers the basic essentials of QA. A two-day version of the course is also available. http://www.nhi.fhwa.dot.gov/training/brows_catalog.aspx
- NHI Course 134064 – “Transportation Construction Quality Assurance”

For information related to the Materials Quality Assurance Program, please contact the following:

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Proficiency Sample Ratings: Being Average Has Never Been So Good

By Brian Johnson, AASHTO Accreditation Program Manager
Posted: October 2010

So you opened up your email notification to see that the latest AASHTO re:source proficiency sample ratings were just posted, you log into the website to view your ratings (Figure 1), and you see ratings of **, -5, -3, 5,4. You think to yourself, "I know that 4 and 5 are good, but what about the negative numbers? Those are below 3, so they must be bad... and what are the stars for? I doubt they're like the stars that my elementary school teacher used to give me... and what is this repeatability rating?"

Sieve Analysis
Total Material Passing the 2.36-mm (No. 8) Sieve (percent) - T27/C136
View Youden Diagram | View Performance Chart

	Sample 167						Sample 168					Repeatability (within-lab)		
	Total Labs	Lab Data	Avg	1S	Z-Score	Lab Rating	Lab Data	Avg	1S	Z-Score	Lab Rating	1S	Z-Score	Lab Rating
4	1448	**86.0**	85.40	0.38	**1.56**	**3**	**84.1**	83.58	0.39	**1.34**	**4**	0.24	**-0.22**	**-5**

= the line of data on the report
= the total labs that submitted data just for that line of data
= the results of sample 167 showing the lab's data, the average of all labs' data, 1 standard deviation, the z-score, and the rating
= the results of sample 168 showing the same information as shown for sample 167
= the repeatability, which shows you how close your z-scores were to each other

Figure 1: A Typical Line of Proficiency Sample Data (Color-Coded)

Calculating Averages and Standard Deviations
The first thing that you should understand is that laboratory ratings are based on the average of the results, although the reported averages are determined only after removing invalid and outlier results. It is important to eliminate them from the rating determination equations so that the ratings are not affected based on what some might consider to be "bad data." We determine a standard deviation for each data set (displayed as "1S" in Figure 1 above) and then begin the process of calculating ratings.

Calculating Z-Scores and Ratings
Each laboratory is rated with two values: a z-score and a lab rating. In statistics, the z-score, also known as the standard score, indicates how many standard deviations a result is from the average. The z-score is determined by the following calculation:

$$\text{Z-Score} = \frac{\text{(Laboratory Test Result - Average Value)}}{\text{(Standard Deviation)}}$$

The laboratory rating calculation is based on the absolute value of the z-score:

If Z-Score <= 1 Then Rating = 5

If Z-Score > 1 And <= 1.5 Then Rating = 4

If Z-Score > 1.5 And <= 2 Then Rating = 3

If Z-Score > 2 And <= 2.5 Then Rating = 2

If Z-Score > 2.5 And <= 3 Then Rating = 1

If Z-Score > 3 Then Rating = 0

Which Way Is Up?
If you're confused by all of this, check out Figure 2 below for a graphical representation of z-scores and ratings. Here are a few quick points to remember:

- Low z-scores are good.
- High ratings are good.
- A negative sign on a z-score or laboratory rating merely indicates that the laboratory's result was below the average, while a positive z-score or rating indicates that the laboratory's result was above the average.

Simply put, the closer your result is to the average, the better your rating. In the competitive world we live in, being average conjures up words like commonplace, mediocre, or ordinary; but in the world of proficiency testing, being average is the definition of excellence!

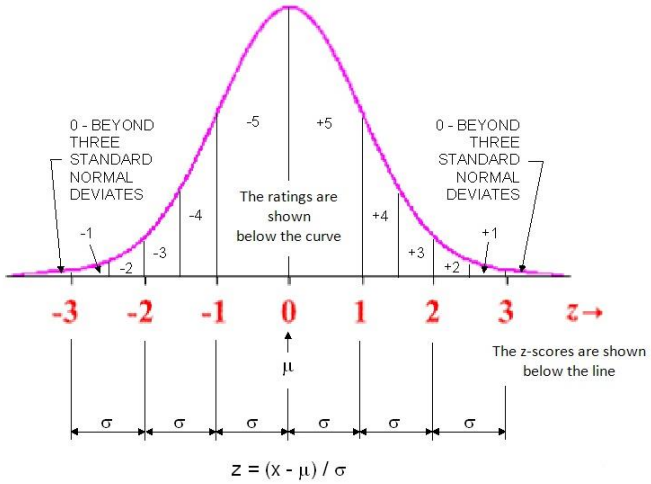

Figure 2: The Normal Distribution of AASHTO re:source Proficiency Sample Data

Low Ratings
Any rating less than a 3(z-score > 2) is considered a low rating according to the AASHTO Accreditation Program, but don't let that bother you unless you consistently receive low ratings. (See Figure 3 and the section below on Performance Charts.) Yes, low ratings are worth investigating, and you might even uncover an equipment problem or procedural mistake. Sometimes, however, your investigation of low ratings will lead you nowhere, and that's okay. The laws of statistics govern that some laboratories have to get low ratings - every lab will be on the low side of the ratings every once in a while. When an AASHTO-accredited laboratory receives low ratings for a given test, they are required to perform a root cause analysis and implement corrective action. If the laboratory receives low ratings again for that test, it might be a sign that either the corrective action was not effective or that the laboratory did not actually apply any corrective action. Now that you understand the concept of ratings, let's discuss a couple of other items that cause confusion.

The ** Rating
The ** rating indicates that the test results have been suppressed. Ratings may be suppressed for several reasons, but usually this is an indication of one of three things: 1) The data collected was for informational purposes only and is not a measure of the laboratory's competency, 2) data received is unusual and does not fit a normal distribution, or 3) there were not enough data points to provide an accurate analysis.

Repeatability (Within-Lab)
Ratings Repeatability is an estimate of the variation in results that you might expect if you repeated the same test over and over in your laboratory. The within-lab rating is based on the difference between the two individual lab results, but also any actual differences between the two sample materials.

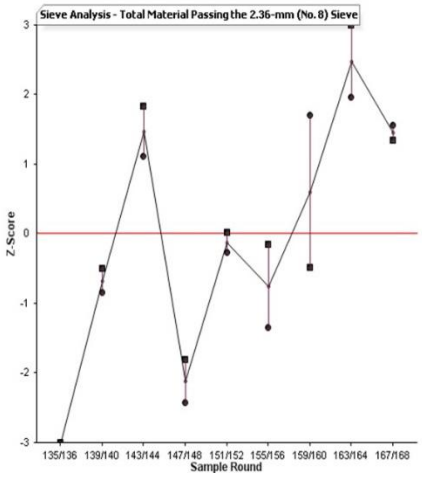

Figure 3: A Sample Performance Chart

Performance Charts
Performance charts provide an easy way to gauge your laboratory's proficiency testing performance over time (see Figure 3). As stated above, too much emphasis should not be placed on an occasional low rating. However, patterns in performance charts should be analyzed carefully, as they are usually good indicators of testing problems. The ideal scenario is to have all points over the center line - results right on the average time after time. Generally speaking, however, points scattered within the bands of +2 and -2 are indicative of good testing performance. Points drifting away from the centerline and points consistently on one side of the centerline are indicative of performance problems.

Now What?
I'm glad you asked. You've just learned all that you need to know about the proficiency sample program and how the results are reported. Now you have to take that knowledge and use it to get the most out of the program. You'll be reviewing your results, repeatability ratings, performance charts, and taking meaningful corrective actions so that you can score 5's and -5's - and you'll be more excited than ever to be average!

~~**1. TEST DATA ENTRY**~~

~~1.1 The Contractor's Quality Control Plan shall clearly state the name(s) of the individual(s) entering test data as outlined in MP 109.00.21.~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

GENERAL INFORMATION GUIDE FOR TECHNICIAN AND INSPECTOR CERTIFICATION PROGRAM (TICP)

1. PURPOSE

1.1. The purpose of the West Virginia Division of Highways (WVDOH) Technician and Inspector Certification Program is to improve the quality assurance of various materials by the certification of industry and WVDOH. This procedure is to establish guidelines for this purpose.

2. GENERAL

2.1. It is the WVDOH's intent to conduct a cooperative program of training, study, and examination so that personnel of the producer, contractor, and the WVDOH will be able to better assure, by their increased technical knowledge, the level of quality required by the governing Specifications.

3. REFERECED DOCUMENTS

3.1. MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement.

~~3.~~4. SCOPE

~~3.1.~~4.1. This procedure is applicable to all requirements, guidelines, and other support documents of the WVDOH that reference conditions, methods, and levels of qualification specific to the WVDOH Training and Certification Program.

~~4.~~5. POLICIES AND ADMINISTRATION

~~4.1.~~5.1. ~~Board of~~ Certification Board - The Certification Program will be carried out in accordance with general policy guidelines established or approved by the Chief Engineer. They will be advised by a Board composed of the following members:

1. Chief Engineer
2. ~~Human Resources Director~~Deputy General Counsel
3. Director of ~~Materials Control Soils and Testing (~~MCS&T~~)~~ - hereafter referred to as "Director"~~'s Director~~
4. Quality Assurance Training Program Administrator
5. Applicable MCS&T Supervisor(s)~~s~~

~~4.1.1.~~5.1.1 The Certification Board will meet ~~upon~~ when called ~~of~~ by the Director.~~MCS&T's Director.~~

4.1.2.5.1.2 Administration - The program will be administered by the Director ~~of the MCS&T~~.

4.1.3.5.1.3 The Program Administrator shall be appointed by the Director. The Program Administrator will be assigned to assist the Director in administering the program and to handle planning, administration, and coordinating functions as may be delegated within the scope of appropriate WVDOH directives.

~~5.6.~~ REQUIREMENTS

5.1.6.1. Where applicable, quality control representatives of ~~a~~ the contractor and/or producer will be certified in ~~one (or more) of~~ the applicable certifications listed ~~in Section 6.0~~below, depending ~~upon~~ on the individual's duties or responsibilities. Responsibilities and qualification requirements are listed in appropriate support documents such as Specifications, Materials Procedures~~,~~ and/or Quality Control Plans ~~and others.~~.

5.2.6.2. For purposes of the WVDOH Quality Assurance Program, a non-~~non-~~WVDOH employee who is a certified ~~technician~~Technician/Inspector represents the company of which ~~he/she is~~they are a full-time employee on the ~~WVDOH~~ project, owner, or partner (as defined by the Federal Wage and Hour Legislation). If said company has subsidiary or affiliated organizations, each organization will be required to have its own certified Technicians/Inspectors where applicable unless the Chief Engineer makes an exception. Exceptions will be granted only when it can be proven that the certified Technician/Inspector ~~actually performs~~performs the duties of the ~~technician~~Technician/~~inspector~~ Inspector for ~~all of~~all the subsidiary or affiliated organizations.

~~5.3. Designated WVDOH personnel will be certified where applicable in one (or more) of the certifications listed in Section 6.0 depending upon the individual's duties and responsibilities.~~

7. CERTIFICATION CLASSES

7.1. The TICP offers certification classes in the following disciplines:

1. Aggregate Technician
2. Aggregate Sampling Inspector
3. Soils & Aggregate Compaction Technician
4. Asphalt Field & Compaction Technician
5. Portland Cement Concrete Technician
6. Portland Cement Concrete Inspector
7. Asphalt Plant Technician
8. Asphalt Preservation Technician
9. ~~Asphalt Field Technician~~Radiation Safety
10. Inertial Profiler Operator

Except as noted, all certifications are valid for a three-year period

7.2.

7.3. All certifications ~~listed in the sections below~~ require written examinations. Some ~~of the listed certifications~~also require a practical examination after successful completion of the written examination.

~~5.4.~~7.4. It is the responsibility of the applicant to determine which certification is applicable to ~~his/her~~their assignment. Following is a description of the certifications listing relevant information about each.~~:~~

8. AGGREGATE TECHNICIAN

8.1. Details of this class are available on the MCS&T Webpage[1]

8.2. The written examination for an Aggregate Inspector consists of the following areas:

1. Aggregate Specifications and Procedures
2. Aggregate Fundamentals
3. Sampling, Control, and Inspection of Aggregates
4. Aggregate Testing

8.3. After successful completion of the written examination, the applicant will be required to pass a practical examination. The technician must demonstrate the testing common to normal aggregate quality requirements.

8.4. Certification as an Aggregate Inspector qualifies the technician to perform sampling and/or testing of aggregates for both Quality Control and Quality Assurance.

~~5.5. AGGREGATE CERTIFICATIONS~~

9. AGGREGATE SAMPLING INSPECTOR~~–~~

9.1. Details of this class are available on the MCS&T Webpage[2]

~~5.5.1.~~9.2. The web-based examination for an Aggregate Sampling Inspector consists of the following areas:

1. Specifications
2. Sampling Fundamentals
3. Sampling Methods and Equipment
4. Gradations
5. T11 Wash Test

9.3. The Aggregate Sampling Inspector requires the successful completion of an online examination.

~~5.6.~~9.4. Certification as an Aggregate Sampling Inspector qualifies the ~~employee,~~technician ~~either Industry or Division,~~ to perform sampling of aggregates for both Quality Control

[1] https://transportation.wv.gov/highways/mcst/Pages/Agg-Technician.aspx
[2] https://transportation.wv.gov/highways/mcst/Pages/aggsamplinspec.aspx

and Quality Assurance.~~relevant to the Quality Control Program or Acceptance Program respectively.~~

10. SOILS AND AGGREGATE COMPACTION ~~INSPECTOR~~TECHNICIAN~~-~~

10.1. Details of this class are available on the MCS&T Webpage[3]

~~5.7.~~10.2. The written examination for this class~~a Soils and Aggregate Compaction Inspector~~ consists of the following areas:

1. Specifications
2. Soil Compaction Test Procedures
3. Radiation Safety and Nuclear Gauge
4. Test Procedure Problems

10.3. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating ~~his/her~~their proficiency in using the testing equipment.

~~5.7.1.~~10.4. Certification of the Soils and Aggregate Compaction ~~Inspector~~ Technician qualifies the ~~employee~~technician~~, either Industry or Division,~~ to conduct tests on all Soil and Aggregate construction materials that require compaction testing.

11. ASPHALT FIELD AND COMPACTION TECHNICIAN

11.1. Details of this class are available on the MCS&T Webpage[4]

11.2. The written examination for this class consists of the following areas:

1. Specifications
2. Surface Preparation
3. Mix Delivery and Placement
4. Joint Construction
5. PWL
6. Troubleshooting
7. Compaction Test Procedures
8. Radiation Safety and Nuclear Gauge
9. Test Procedure Problems
10. Testing Forms

11.3. Successful completion of the written examination and a practical examination test is required.

11.4. Certification as an Asphalt Field and Compaction Technician qualifies the technician to oversee or inspect asphalt pavement construction. In addition, the class hand-out material is a valuable reference tool for each stage of the construction process. The

[3] https://transportation.wv.gov/highways/mcst/Pages/compactioninspector.aspx
[4] https://transportation.wv.gov/highways/mcst/Pages/AsphaltFieldTech.aspx

required radiation safety training is included in this class and will certify attendees with a passing score to perform nuclear density testing on asphalt pavements.

11.5. Asphalt Field and Compaction Technicians must also be evaluated by qualified District personnel on the first WVDOH paving project in which they perform this testing.

11.5.1. The District personnel will make the decision as to whether or not the technician is correctly conducting the nuclear density tests in accordance with the Specifications.

11.5.2. The District will also complete an evaluation form and send it to the MCS&T for processing.

11.5.3. A technician that does not demonstrate proper nuclear density testing techniques shall not be allowed to continue testing on the WVDOH project. They must be replaced by another qualified technician. Anyone who does not meet the evaluation standards must provide proof of additional WVDOH approved radiation safety training before another evaluation will be conducted.

~~6.~~ PORTLAND CEMENT ~~CONCRETE CERTIFICATIONS~~

12. CONCRETE TECHNICIAN ~~–~~

12.1. Details of this class are available on the MCS&T Webpage[5]

~~6.1.~~12.2. The written examination this class ~~for a Concrete Technician~~ consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

12.3. The Concrete Technician requires only the successful completion of the written examination; no practical examination test is required.

12.4. Certification of the Concrete Technician qualifies the ~~employee, either Industry or Division,~~technician to make plant and mix adjustments, proportioning, and other concrete related duties.

~~6.2.~~12.4.1. National Ready Mixed Concrete Association (NRMCA) Concrete Technologist Certification Course, "Short Course," will be accepted as a portion of the West Virginia PCC Technician training. However, the applicant must pass the online West Virginia PCC Technician written certification test before a certification will be issued.

13. ~~CONCRETE~~ PORTLAND CEMENT CONCRETE INSPECTOR~~INSPECTOR –~~

13.1. Details of this class are available on the MCS&T Webpage[6]

[5] https://transportation.wv.gov/highways/mcst/Pages/concretetech.aspx
[6] https://transportation.wv.gov/highways/mcst/Pages/concreteinspector.aspx

~~6.3.~~13.2. ~~-~~The written examination for this class ~~a Concrete Inspector~~ consists of the following areas:

1. Fundamentals
2. Sampling and Testing
3. Control and Inspection
4. Specifications

13.3. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating ~~his/her~~their proficiency in conducting tests common to concrete quality control.

13.4. Certification as a Concrete Inspector qualifies the ~~employee~~technician~~, either Industry or Division,~~ to perform sampling and/or testing of concrete ~~relevant to the~~for Quality Control ~~Program~~ and/or Quality Acceptance ~~Program respectively~~.

13.4.1. American Concrete Institute (ACI) Field Testing Grade I certification will be accepted as a portion of the West Virginia PCC Inspector training. However, the applicant must pass the online West Virginia PCC Inspector written certification test before a certification will be issued.

~~**7. ASPHALT MIXTURE CERTIFICATIONS**~~

14. ASPHALT PLANT TECHNICIAN~~–~~

14.1. Details of this class are available on the MCS&T Webpage[7]

~~7.1.~~14.2. The written examination for ~~an Asphalt Plant Technician~~this class consists of the following areas:

1. Specifications
2. Fundamentals
3. Sampling and Testing
4. Control and Inspection
5. Mix Proportioning and Adjustment

14.2.1. After successful completion of the written examination, the applicant will be required to pass a practical examination demonstrating their proficiency in conducting tests common to Asphalt quality control.

~~7.1.1.~~14.2.2. Certification of the Asphalt Technician qualifies the employee~~, either Industry or Division,~~ technician to take asphalt mixture samples, perform quality control or quality assurance testing on plant produced asphalt mixtures, make plant and mix adjustments, aggregate proportioning, and other duties.

[7] https://transportation.wv.gov/highways/mcst/Pages/hotmixasp.aspx

15. ASPHALT PRESERVATION TECHNICIAN~~ASPHALT FIELD TECHNICIAN (AFT) ASPHALT FIELD TECHNICIAN~~

Commented [DB1]: Is this now the Asphalt Preservation Technician?

15.1. Details of this class are available on the MCS&T Webpage[8]

15.2. This exam is based on web-based training found in the TC3 Course "Flexible Pavement Preservation Treatment Series."

15.3. A printed copy of the Certificate of Training from this course is required to be presented for registration on the day of the exam.

15.4. The written examination for an Asphalt Preservation Technician consists of the following areas in regards to chip seals, micro surfacing, thin overlays, and crack sealing~~The written examination for an Asphalt Field Technician. This class consists of the following areas:~~

1. Fundamentals of Preservation
2. Pavement Conditions and Treatment Selection
3. Performance Characteristics
4. ~~1.~~ Inspection and Best Practices~~Specifications~~
5.

15.4.1. Certification of the Asphalt Preservation Technician is currently optional. This certification is for technicians who want to be more prepared for asphalt preservation style projects.

~~7.2.~~16. RADIATION SAFETY

~~7.2.1.~~16.1. This certification is required by the Nuclear Regulatory Commission (NRC) before operating a portable nuclear gauge. The training consists of 3 - 4 hours classroom instruction and has a 25-50 question closed book exam. A minimum score of 70 percent is required for passing the course. The course and exam will cover the following areas:

~~2.~~5. Proper storage and security of portable nuclear gauges
~~3.~~6. Transportation of portable nuclear gauges
~~4.~~7. Personal safety while operating a portable nuclear gauge.

17. INERTIAL PROFILER OPERATOR

Commented [DB2]: Ask Vince - separate class?

17.1. This certification does not have class, nor does the test need to be proctored by the WVDOH. The exam is provided upon request. Details of this certification are in MP 720.10.01 - Guide for Using a High-Speed Inertial Profiler to Measure the Longitudinal Profile of Pavement

17.2. The written examination for the inertial profiler operator covers of the following areas:

1. WVDOH Specifications
2. AASHTO and ASTM Specifications

[8] https://transportation.wv.gov/highways/mcst/Pages/Asphalt-Preservation-Technician.aspx

3. Knowledge of operation and analysis of collected data.

17.3. This certification allows a technician to operate a lightweight/low-speed and high-speed inertial profiler.

18. TESTING PROTOCL

18.1. TESTING PROTOCOL

18.1.1. The TICP has a testing protocol that must be followed. The protocol includes testing environment, time limits, proctoring exams, etc. The entire protocol will be covered with attendees prior to testing.

18.2. CLASS SUPPLY LIST

18.2.1. We recommend that participants bring the following items with them to the certification classes:

1. Laptop Computer or Tablet (Mandatory)
2. Photo ID
3. Current WV Specification book and the latest Supplemental to the Specification book. You will need this during the test. These are also available in printable PDF format on the WVDOH Webpage.[9]
4. Hand held calculator (No electronic devices other than a Hand held calculators are allowed to be used during testing.)
5. Highlighters
6. Sticky Notes
7. Ruler / Straight edge

~~7.3.~~18.3. Special needs and requests:

~~7.3.1.~~18.3.1. Applicants with special needs should notify the Quality Assurance Training Program Administrator prior to the class to ensure that the training location is prepared to accommodate their needs.

Commented [DB3]: Fix header to be consistent.

19. CERTIFICATION AND RE-CERTIFICATION

19.1. Certification

19.1.1. An individual must pass the examination in each level for which they are requesting certification. Unless otherwise noted, to pass the written examinations, the applicant must obtain a minimum score of 70 percent.

19.1.2. If an applicant fails to receive a minimum score of 70% on the first exam, they will be given another attempt at a later date to score a 70%. This second attempt shall be a subsequent, scheduled make-up exam. Failure to attend any examination counts as a failed exam.

[9] https://transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx

19.1.3. Upon successfully completing the requirements for certification, applicants may print their certification card from the divisions Webpage. http://dotftp.wv.gov/materialsdir/

19.1.4. This certification is not transferable. A certification is valid for up to Three years and expires December 31, of the 3rd year of certification.

19.2. Re-Certification

19.2.1. The responsibility for obtaining re-certification shall lie with the certified individual.

19.2.1.1. Certification holders are responsible to ensure that their certifications stay current. The West Virginia Division of Highways will no longer mail reminder letters to certification holders.

19.2.2. The renewal of all certifications shall require a written exam and a hands-on practical exam, where applicable.

19.2.3. Applicants will be given two scheduled attempts to pass the recertification exam and one attempt to pass the practical exam (each, respectively). Any applicant that fails to acquire a minimum score of 70% on a recertification exam or who fails the subsequent practical exam will not have their certification renewed. The applicant will be required to take the respective certification classes at the next available time given by MCS&T.

19.2.4. Any failed recertification examination taken prior to the expiration date of the current certification, either practical or written will not result in termination of any current certification prior to the expiration date of that certification.

19.2.5. The certification holder is responsible updating their personal information on the online learning website[10].

19.2.6. If an applicant seeking recertification disagrees with a recertification decision, they may file a written appeal with the board.

19.3. If certification is not renewed by December 31, the Technician should take the class and shall take the full exam and practical at the next available offering.

20. RECIPROCAL CERTIFICATIONS

20.1. Acceptance of WVDOH Certifications by other state agencies is at the sole discretion of the other agency.

~~8.~~21. TRAINING

~~8.1.~~21.1. Training - The Division of Highways, contractors, and producers may sponsor courses of instruction consisting of schools and seminars to help prepare personnel for certification under one or more of these certification programs. To the extent possible, these courses of instruction will be joint efforts of the industry and WVDOH. Nothing in this document shall be interpreted to prohibit any party from conducting courses of instruction for their personnel to assist in preparation for these exams.

[10] http://www.onlinelearning.wv.gov/student/home.html

8.2.21.2. The purpose of the schools is to provide helpful information and instruction for people preparing to take the WVDOH Technician/Inspector examinations. These courses are designed to provide instruction for people with a basic foundation in the subject matter. Work experience in the subject matter is encouraged before attending classes.

9.22. EXAMINATIONS

9.1.22.1. Renewal and Certification – Certifications shall be renewed as required in ~~the Technician Inspector Certification Program (TICP) handbook~~this document. General guidance and information for renewal will be recommended by the Board as required by the Chief Engineer. All certifications shall terminate on December 31st of the year of expiration. There may be written, and practical examination required for recertification where applicable. ~~More recertification information can be found in the Technician Inspector Certification Program (TICP) handbook available on the MCS&T's Webpage.~~

~~1.1.1 The Implementation Committee or other designated party shall establish internal criteria for renewal. The Technician Certification Handbook with the current rules and requirements shall be posted on the MCS&T's Webpage.~~

9.1.1.22.1.1. Upon obtaining renewal of certification, a renewal card may be printed from the MCS&T Webpage.

9.2.22.2. For further information on classes, recertification, schedules, class calendars and other helpful information please visit the MCS&T's Webpage.

10.23. FUNCTIONS AND RESPONSIBILITIES

10.1.23.1. Contractor or Producer - The producer and contractor will be responsible for product control of all materials during the handling, blending, and mixing operations. The contractor and producer also will be responsible for the formulation of a design mix that will be submitted to the Division for approval.

10.1.1.23.1.1. Technician/Inspector - A Quality Control representative of a contractor or producer should be a certified Technician/Inspector as outlined in Section 5. and whose responsibilities may include such duties as proportioning and adjusting the mix, sampling and testing the product, and preparing control charts.

10.2.23.2. The WVDOH - The WVDOH is responsible for all acceptance decisions.

10.2.1.23.2.1. District Materials Supervisor - District Materials activities are the responsibility of the District Materials Supervisor.

23.2.2. Division Technicians and Inspectors – The WVDOH Technicians and Inspectors will be assigned as necessary to carry out the required acceptance decision activities. The WVDOH representatives will not issue instructions to the contractor or producer regarding process control activities. However, the WVDOH representatives have the responsibility to question, and where necessary to reject, any operation or sequence of operations, which are not performed in accordance with the contract documents.

~~11.~~24. REVOCATION OF CERTIFICATION

24.1. If at any time a WVDOH, contractor's, producer's, or supplier's Technician or Inspector is found to have altered or falsified test reports or is found to have improperly performed tests or reported their results, the individual's certification may be rendered invalid by the Chief Engineer upon recommendation of the Board.

~~1.2 The Certification Board grants certification upon satisfactory completion and maintenance of certain conditions and may be revoked upon any breach of these conditions.~~

~~11.1.~~24.2. Generally, certifications may be revoked if in the opinion of the certifying authority, an individual has knowingly committed acts detrimental to the integrity of the Certification Program or transportation industry. Examples of situations that warrant revocation include, but are not limited to:

1. Deliberate falsification of field or quality control test results or records.
2. Deliberate falsification of calculations, test results or materials
3. Cheating on certification/re-certification exams.
4. Submittal of false information on certification applications.
5. Submitting trial mix mixture and/or calculations completed by someone other than the signatory, or knowingly supplying trial mix mixture and/or calculations for another individual's certification.

Commented [DB4]: SJ - What does this mean? What are they referring?

24.3. The Quality Assurance Training Program Administrator will take the lead in gathering facts and investigating any allegations which may require revocation of a certification. The review board will notify the individual in writing of intent to revoke certification(s).

25. APPEALING A DECISION

25.1. Any individual who disagrees with a decision by the Certification Board has 10 business days from the date of receipt of the notification to respond in writing to the board and present documentation to support their continued certification and/or request an opportunity for a meeting to present their case.

Appeals should be mailed to:
Certification Board
ATTN: Quality Assurance Program Administrator
West Virginia Division of Highways
190 Dry Branch Dr.
Charleston, WV 25306

25.2. If the individual fails to respond within 10 days of receipt of the original notification of revocation letter, the revocation becomes final.

25.3. Not later than 20 business days after receiving a request for a meeting from the individual, the Certification Board will schedule a meeting in which the appellant can present their case. If the Certification Board was not persuaded by the documentation provided by the appellant and believes that revocation of the certification is warranted,

the appellant may file a written appeal to the Chief Engineer for review. All information including any letter(s) of explanation from the appellant will accompany the documents submitted to the Chief Engineer. The board will mail the decision of the Chief Engineer to the appellant. The decision by the Chief Engineer is final.

26. THE LENGTH OF REVOCATION:

26.1. First Offense

26.1.1. This may include revocation of all certifications for up to one year. After the revocation period the individual may obtain recertification by passing respective certification exam and a practical (if applicable). If either exam is failed, the individual will be required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.2. Second Offense

26.2.1. This may include revocation of all certifications for up to five years. There is also the possibility of demotion and reduced pay for WVDOH employees. After the revocation period the individual may obtain recertification by passing the respective certification exam and a practical (if applicable) at the discretion of the board. If either exam is failed, the individual will be required to take the certification class before being permitted to test again. The individual will be required to retake and pass the written exam regardless of whether it was previously passed.

26.3. Third Offense

26.3.1. This may include revocation of all certifications for life. There is also the possibility of termination, demotion and reduced pay for WVDOH employees.

27. CONTACT INFORMATION

27.1. If an applicant/technician/appellant has any questions about the DOH program or needs more information. Please contact: Qaschoolscoordinator@wv.gov

Michael A Mance, PE
Interim Director
Materials Control, Soils & Testing Division

MP 106.03.50 Steward – Personnel, Payroll Section

MM:h
~~ATTACHMENT~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

WVDOH BUY AMERICA ACCEPTANCE GUIDELINES

1. PURPOSE

1.1 To set forth instructions for compliance with both State and Federal Buy America Requirements (henceforth referred to as "Buy America Requirements"), as listed in this document.

2. REFERENCED DOCUMENTS

2.1 PUBLIC LAW 117–58—NOV. 15, 2021, Infrastructure Investment and Jobs Act.

2.2 Build America, Buy America Act (BABA).

2.3 23 U.S.C. 313 and 23 CFR 635.410 "Buy America Requirements".

2.4 2 CFR part 184 Buy America Preferences for Infrastructure Projects.

2.5 M-22-11 Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.6 M-24-02 Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

2.7 Chapter 5, Article 19 and Chapter 5A, Article 3, Section 56 of the West Virginia Code, entitled "West Virginia American Steel Act of 2001."

2.8 West Virginia Notary Handbook, Current Edition.

2.9 MP 106.10.51 – WVDOH Buy America Waiver Guidelines.

3. ACCEPTANCE OF MATERIALS

3.1 This procedure applies to the following:

1. Steel and Iron
2. Manufactured Products
3. Construction Materials
4. Section 70917(c) Materials

3.2 An article, material, or supply shall only be classified into a single category listed in Section 3.1. In some cases, an article, material, or supply may not fall under any of these categories. Classification of the category must be made based on the status of article, materials, or supply at the time it is brought to the work site for incorporation into the project. The work site is generally the location of the project at which the materials will be incorporated. An article, material, or supply permanently incorporated into a project must meet the Buy America Preference for only the single category in which it is classified.

3.3 A Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to a project. As such, it does not apply to

tools, equipment, and supplies, such as temporary scaffolding brought to the construction site and removed at or before the completion of the project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished project but are not an integral part of the structure or permanently affixed to the project.[1]

3.3.1 Buy America preference does not apply to materials such as temporary paint or temporary traffic control devices.

4. STEEL AND IRON

4.1 Pursuant to Buy America Requirements, all manufacturing processes for steel and iron materials must take place in the United States.

4.2 Definition

4.2.1 "Iron or steel products" means articles, materials, or supplies that consist wholly or predominantly of iron or steel or a combination of both.

4.2.1.1 "Predominantly of iron or steel or a combination of both" means that the cost of the iron and steel content exceeds 50 percent of the total cost of all its components. The cost of iron and steel is the cost of the iron or steel mill products (such as bar, billet, slab, wire, plate, or sheet), castings, or forgings utilized in the manufacture of the product and a good faith estimate of the cost of iron or steel components.

4.3 Standard

4.3.1 This includes all processes from the initial melting stage through application of coatings occurs in the United States.

5. MANUFACTURED PRODUCTS

5.1 Pursuant to Buy America Requirements, all Manufactured Materials are required to be produced in the United States. All manufacturing processes shall occur in the United States.

~~5.1 The Federal Highway Administration (FHWA) has a longstanding waiver in effect exempting Manufactured Products from Buy America Requirements.~~

5.2 Definition

5.2.1 Manufactured products means:

1. Articles, materials, or supplies that have been:
   A. Processed into a specific form and shape;
   B. or Combined with other articles, materials,
   C. or supplies to create a product with different properties than the individual articles, materials, or supplies.

2. If an item is classified as an iron or steel product, or a construction material, then it is not a manufactured product. However, an article, material, or supply classified as a manufactured product under 2 CFR 184.4(e) and paragraph (1) of

[1] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 4

this definition may include components that are construction materials, iron or steel products, or Section 70917(c) materials.

5.3 Standard

5.3.1 Pursuant to Buy America Requirements, all manufactured products used in the project are produced in the United States; this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard that meets or exceeds this standard has been established under applicable law or regulation for determining the minimum amount of domestic content of the manufactured product.[2]

5.3.1.1 In determining whether the cost of components for manufactured products is greater than 55 percent of the total cost of all components, use the following instructions:

1. For components purchased by the manufacturer, the acquisition cost, including transportation costs to the place of incorporation into the manufactured product (whether or not such costs are paid to a domestic firm), and any applicable duty (whether or not a duty-free entry certificate is issued).
2. For components manufactured by the manufacturer, all costs associated with the manufacture of the component, including transportation costs as described in paragraph (1), plus allocable overhead costs, but excluding profit. Cost of components does not include any costs associated with the manufacture of the manufactured product.

6. CONSTRUCTION MATERIALS.

6.1 Pursuant to Buy America Requirements, all Construction Materials are required to be produced in the United States. All manufacturing processes for the Construction Materials shall occur in the United States.

6.2 Definition

6.2.1 Construction materials means articles, materials, or supplies that consist of only one of the items listed in Section 6.2.1.1, except as provided in Section 6.2.1.2. To the extent one of the items listed in Section 6.2.1.1 contains as inputs other items listed in this section, it is nonetheless a construction material.

6.2.1.1 The listed items are:

1. Non-ferrous metals;
2. Plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
3. Glass (including optic glass);
4. Fiber optic cable (including drop cable);
5. Optical fiber;
6. Lumber;
7. Engineered wood; and

[2] M-24-02: Memorandum for the Heads of Executive Departments and Agencies, Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, Page 15-16.

8. Drywall.

6.2.1.2 Minor additions of articles, materials, supplies, or binding agents to a construction material do not change the categorization of the construction material.

6.3 Standard

6.3.1 The Buy America Preference applies to the following construction materials incorporated into projects. Each construction material is followed by a standard for the material to be considered "produced in the United States."

1. Non-ferrous metals. All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
2. Plastic and polymer-based products. All manufacturing processes, from initial combination of constituent plastic or polymer-based inputs, or, where applicable, constituent composite materials, until the item is in its final form, occurred in the United States.
3. Glass. All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
4. Fiber optic cable (including drop cable). All manufacturing processes, from the initial ribboning (if applicable), through buffering, fiber stranding and jacketing, occurred in the United States. All manufacturing processes also include the standards for glass and optical fiber, but not for non-ferrous metals, plastic and polymer-based products, or any others.
5. Optical fiber. All manufacturing processes, from the initial preform fabrication stage through the completion of the draw, occurred in the United States.
6. Lumber. All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
7. Drywall. All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.
8. Engineered wood. All manufacturing processes from the initial combination of constituent materials until the wood product is in its final form, occurred in the United States.

6.3.2 Except as specifically provided, only a single standard under this section should be applied to a single construction material.

7. SECTION 70917(C) MATERIALS

7.1 The standards developed under BABA 70915(b) (1) shall not include cement and cementitious materials, aggregates such as stone, sand, or gravel, or aggregate binding agents or additives as inputs of the construction material. These are referred to as 70917(C) materials.

7.2 Definition

7.2.1 Section 70917(c) materials means cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives. See section 70917(c) of the Build America, Buy America Act.

7.3 These materials are exempt from Buy American Requirements.

8. BUY AMERICA COMPLIANCE.

8.1 On a given project, the Division shall not accept, approve, authorize, or make any payments to any Contractor not fully compliant with Buy America.

8.1.1 When Buy America Requirements apply, the Contractor shall furnish a notarized Certificate of Compliance signed by their official with knowledge and authority to certify that all applicable materials and products to be incorporated into the project, including those of any subcontractors and suppliers, are compliant with Buy America Requirements. This shall be done prior to the permanent incorporation of the materials into the project.

8.1.2 The notarized Certificate of Compliance shall contain the following information:

8.1.2.1 Title: Buy America Certification of Compliance.

8.1.2.2 The Name, Address and Contact Information for the Contractor.

8.1.2.3 A contractor statement that demonstrates compliance with Buy America Requirements.

8.1.2.4 The Contract ID for the Material (if applicable).

8.1.2.5 Both the Federal and State Project Number for the Material (if applicable).

8.1.2.6 The name of the material referenced in the Certificate of Compliance. This material name shall be a clear, common name for the material as stated in the proposal. Part Numbers, etc., may also be on the document if the contractor wishes.

8.1.2.7 The Line Item for the Material (if applicable).

8.1.2.8 The Bid and/or Placed Quantity of the Material.

8.1.2.9 Signature of the Contractor and date.

8.1.2.10 A list of materials on the project that “Buy America” applies but are not Buy America compliant.

8.1.2.11 The document must be notarized as per the “West Virginia Notary Handbook.”

8.2 Attachment 1 shows a sample Certificate of Compliance.

8.2.1 Multiple items may be listed on the Certificate of Compliance, though all the information for each line must be on the document.

8.2.2 A list of these materials may be referenced on an attached page as long as that page is also signed and notarized.

9. BUY AMERICA WAIVERS

9.1 Buy America Waivers are outlined in MP 106.10.51 as per "§ 184.7 Federal awarding agency's issuance of a Buy America Preference waiver" and "23 CFR 635.410(c)".

10. BUY AMERICA MATERIALS

10.1 Attachment 2 includes a list of materials and products used in WVDOH construction projects and the applicability of Buy America Requirements. This attachment also shows each category of each based on Section 3.1 of this document. Finally, if the material is not applicable to Buy America Requirements, justification is given. Example exemptions are as follows:

1. Historic Waiver: Manufactured Product is waived by FHWA as per Section 5 of this Document.
2. Temporary Material: Material is not permanently incorporated into the project.

10.1.1 This materials and products list may be updated by the Director of MCS&T as needed to ensure compliance with Buy America Requirements. Any update to this form will be in accordance with guidance from and through an affirmation process with FHWA.

10.1.2 Glass added to a permanent paint product requires a Certificate of Compliance.

10.1.3 Attachment 3 includes OMB Memorandum M-24-02[3], dated October 25, 2023, for additional guidance and as the source material for WVDOH's compliance.

[3] https://www.whitehouse.gov/wp-content/uploads/2023/10/M-24-02-Buy-America-Implementation-Guidance-Update.pdf

11. DOCUMENTATION OF BUY AMERICA CERTIFICATION OF COMPLIANCE

11.1 The Certificate of Compliance shall be placed in the QC Plan Folder in ProjectWise (or the current WVDOH approved document retention software) under the contract.

Michael Mance, P.E.
Director
Materials Control, Soils and Testing Division

MP 106.10.50 Steward – Materials Control Section
ATTACHMENTS

Buy America Certification of Compliance

Acme Construction Company
123 Main Street
Charleston, WV 25302

Ship Date: 10/31/2023

The below listed materials and products meets all the requirements of all Federal and State Laws for Buy America, including but not limited to: Chapter 5, Article 19 and Chapter 5A, Article 3 Section 56 of the West Virginia Code; 23 U.S.C. 313 Buy America, 23 CFR 635.410 Buy America Requirements, and Build America, Buy America Act, Section 70914.

This Certification of Compliance is for the material and project listed below:

CID: 22000005R1
Federal Number: B-0010(000)X
State Number: U002-00-1.00

Line: 0020	Widget, Part Q^{i}	500 Cubits
Line: 0025	Widget, Part H^{r}	300 Cubits

Non-Compliant Buy America Materials

Line: 0055	Widget, Part I^{z}	300 Cubits

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA

Charleston, WV 25304
My Commission Expires October 16, 2027

Janie Doe, Contractor President

Attachment 2: Full document is available at the WVDOH MCST Toolbox[4].

[4] https://transportation.wv.gov/highways/mcst/Pages/tbox.aspx

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

WVDOH BUY AMERICA WAIVER AND EXCEPTION GUIDELINES

1. PURPOSE

1.1. To set forth instructions for Waivers and Exceptions for Buy America Materials.

2. REFERENCED DOCUMENTS

2.1. MP 106.10.50 – WVDOH Buy America Acceptance Guidelines.

2.2. West Virginia Code | §5A-3-56[1]

2.3. West Virginia Code | §5-19[2]

3. OVERVIEW OF BUY AMERICA WAIVERS

3.1. In certain circumstances, waivers may be applied to materials exempting them from both Federal and State Buy America requirements.

3.2. For each type of material as described in MP 106.10.50, a separate process is described.

3.3. If the contractor chooses to use foreign material for steel and iron, aluminum and glass, both Federal and State laws require Buy America waivers. These waivers are independent of each other. Compliance and acceptance of one waiver does not in any way shape or form demonstrate compliance with the other waiver.

3.4. If the contractor chooses to use foreign material for construction materials, Federal law requires Buy America waivers.

3.5. There are two different types of waivers

3.5.1. The general applicability waivers are waivers that applies generally across multiple projects. A general applicability waiver can be "product-specific" (e.g., applies only to a product or category of products) or "non-product specific" (e.g., applies to all "manufactured products").

3.5.2. The Project-Specific Waivers are waivers on a project-by-project basis and they are not transferable. Therefore a waiver that is approved for one particular project cannot be used on another project. WVDOH may request a project specific waiver based on non-Availability and Public Interest

Commented [CH(1]: Source https://www.whitehouse.gov/wp-content/uploads/2022/04/M-22-11.pdf

Commented [CH(2]: Source https://www.fhwa.dot.gov/construction/contracts/buyam_qageneral.cfm

[1] http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=hb2207%20intr.htm&yr=2001&sesstype=RS&i=2207
[2] https://code.wvlegislature.gov/5-19/

4. FEDERAL BUY AMERICA WAIVERS FOR STEEL AND IRON

4.1. Project-Specific Waiver WVDOH may request a waiver from Federal Buy America requirements for steel and iron materials based on:

(1)Public Interest: the application of Buy America requirements would be inconsistent with the public interest; or

(2) non-Availability: steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

4.2. If a contractor wishes to apply for a Project-Specific Waiver, they will contact the Division with justification and Relevant supporting information . This will be reviewed by the WVDOH and will be sent to FHWA for approval.

5. STATE BUY AMERICA WAIVERS FOR STEEL AND IRON

5.1. As provided for in H. B. 2207, West Virginia Code | §5A-3-56, the Director of the West Virginia State Purchasing Division may authorize in writing the use of a minimal amount of foreign steel products if either of the following is true:

5.2. The director of the purchasing division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

6. FEDERAL BUY AMERICA WAIVERS FOR MANUFACTURED PRODUCTS

6.1. There is a general applicability waiver for Manufactured Products.

6.2. There are currently no additional exceptions for Federal Buy America Requirements for Construction Materials or Manufactured Products.

7. FEDERAL BUY AMERICA WAIVERS FOR CONSTRICTION MATERIALS

7.1. Project-Specific Waiver

7.2. WVDOH may request a waiver from Federal Buy America requirements for construction materials based on:

(1) Public Interest: the application of Buy America requirements would be inconsistent with the public interest; or

(2) non-Availability: steel and iron materials/products are not produced in the United States in sufficient and reasonably available quantities which are of a satisfactory quality.

7.3. If a contractor wishes to apply for a Project-Specific Waiver, they will contact the Division with justification and Relevant supporting information . This will be reviewed by the WVDOH and will be sent to FHWA for approval.overview of Buy America Exceptions

7.4. Federal Minimal Use Exception

7.4.1. As provided for in 23 CFR 635.410(b)(4), an exception from Federal Buy America requirements exists for the minimal use of steel and iron materials “if the cost of such

materials used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or $2,500, whichever is greater. For the purposes of this paragraph, the cost is that shown to be the value of the steel and iron products as they are delivered to the project".

7.5. State Minimal Use Exception

7.5.1. As provided for in Chapter 5A, Article 3 Section 56 of the West Virginia Code, an exception from West Virginia domestic steel preference requirements exists for the minimal use of foreign steel products, when authorized in writing by the director of Purchasing Division, if "The cost for each contract item used does not exceed one tenth of one percent of the total contract cost or $2,500, whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project."

7.6. There are no Buy America exceptions for Construction Materials and Manufactured Products.

_____

Michael A. Mance, P.E.
Interim Director
Materials Control, Soils & Testing Division

MP 106.10.51 Steward – Materials Control Section
MM:B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL AND ACCEPTANCE REQUIREMENTS FOR PORTLAND CEMENT CONCRETE

1. PURPOSE

1.1 To establish minimum requirements for Contractor's Quality Control (QC) system and the Division's Acceptance Plan. It is intended that these minimum requirements be followed in detailing the inspection, sampling, and testing deemed necessary to maintain compliance with all Specification requirements.

2. SCOPE

2.1 This Materials Procedure (MP) is applicable to all Portland Cement Concrete (PCC) items, and it outlines the quality control procedures for both plant and field operations and includes procedures for approving and using Master and/or Project Specific QC Plans. This procedure also aids in documentation and retention of QC Plans in ProjectWise.

3. REFERENCED DOCUMENTS

3.1 AASHTO M 201 - Standard Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes.

3.2 AASHTO T 22 - Standard Method of Test for Compressive Strength of Cylindrical Concrete Specimens.

3.3 AASHTO T 231 - Standard Method of Test for Capping Cylindrical Concrete Specimens.

3.4 ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation.

3.5 ASTM C1231 - Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Cylindrical Concrete Specimens.

3.6 ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

3.7 ASTM C511 - Standard Specification for Mixing Rooms, Moist Cabinets, Moist Rooms, and Water Storage Tanks Used in the Testing of Hydraulic Cements and Concretes.

3.8 ASTM C617 - Standard Practice for Capping Cylindrical Concrete Specimens.

3.9 MP 109.00.21 - Basis for Charges for Non-Submittal of Sampling & Testing Documentation by the Established Deadline.

3.10 MP 300.00.51 - Procedural Guidelines for Maintaining Control Charts for Aggregate Gradation.

3.11 MP 601.03.52 – Procedural Guidelines for Maintaining Control Charts for Portland Cement Concrete.

3.12 MP 601.04.20 - Curing Concrete Test Specimens in The Field.

3.13 MP 601.05.50 - Quality Assurance Procedures for Portland Cement Concrete.

3.14 MP 700.00.54 - Procedure for Evaluating Quality Control Sample Test Results with Verification Sample Test Results.

4. GENERAL REQUIREMENTS

4.1 The Contractor shall provide and maintain a quality control system that will provide reasonable assurance that all materials and products submitted to the Division for acceptance will conform to the contract requirements whether manufactured or processed by the Contractor or procured from suppliers, subcontractors, or vendors. The Contractor shall perform or have performed the inspections and tests required to substantiate product conformance to contract document requirements and shall also perform or have performed all inspections and tests otherwise required by the contract. The Contractor's quality control inspections and tests shall be documented and shall be available for review by the Engineer throughout the life of the contract. The Contractor shall maintain standard equipment and qualified personnel as required by the Specifications to assure conformance to contract requirements. Procedures will be subject to the review of the Division before the work is started.

5. QUALITY CONTROL PLAN

5.1 The Contractor shall prepare a QC Plan detailing the type and frequency of inspection, sampling, and testing deemed necessary to measure and control the various properties of materials and construction governed by the Specifications. As a minimum, the sampling and testing plan should detail sampling location, sampling techniques, and test frequency to be utilized. Quality control sampling and testing performed by the Contractor may be utilized by the Division for acceptance.

5.1.1 A QC Plan must be developed by the Contractor and submitted to the Engineer prior to the start of construction on every project. Acceptance of the QC Plan by the Engineer will be contingent upon its concurrence with these guidelines.

5.1.2 As work progresses, an addendum(s) may be required to a QC Plan to keep the QC program current. Personnel may be required to show proof of certification for testing.

5.2 <u>Quality Control Plan Guidelines</u>

5.2.1 The Plan shall identify the personnel responsible for the Contractor's quality control. This should include the company official who will act as the liaison with Division personnel, as well as the Certified Portland Cement Concrete Technician who will direct the inspection program at the plant or in the field depending if it is a plant or field QC Plan. Their phone number and email address must also be included as a means for contact by the Division personnel.

5.2.2 All classes of concrete and corresponding mix design numbers, which may be used, shall be listed on the Plant QC Plan. All classes of concrete, which may be used, shall be listed on the Field QC Plan.

5.2.3 Process control sampling, testing, and inspection should be an integral part of the contractor's quality control system. In addition to the above requirements, the Contractor's QC Plan should document the process control requirements shown in Table 1 of Attachment 1. The process control activities shown in Table 1 are considered to be normal activities necessary to control the production and placement of a given product or material at an acceptable quality level. To facilitate the Division's activities, the Contractor, as per ML-25, shall retain all completed gradation samples until further disposition is designated by the Division.

5.2.4 All concrete producers shall provide an E-Ticket that meets the requirements of Section 109.20.1 of the Specifications.

5.2.5 All sampling and testing shall be in accordance with the methods and procedures required by the Specifications. Measuring and testing equipment shall be standard and properly calibrated as per the specified test procedures. If alternative sampling methods, procedures, and inspection equipment are to be used, they shall be detailed in the QC Plan. Any QC testing that is not performed in accordance with the methods and procedures required by the Specifications shall be considered an invalid test, and the applicable penalty for the cost associated with that test, in accordance with MP 109.00.20, will be assessed to the contractor, along with the applicable price adjustment in Section 105.3. The test specimen(s) represented by an invalid test shall be considered as not meeting Specifications and documented accordingly. The Division may, however, use the results of an invalid test to determine if material may be accepted and allowed to remain in place and if payment may be made for the material represented by the invalid test.

5.2.5.1 Any individual who samples or tests plastic concrete for quality control purposes shall be certified as a WVDOH PCC Inspector.

5.2.5.2 Any Laboratory which tests the hardened concrete cylinders for the Contractor, for quality control purposes, shall be listed in the Contractor’s QC Plan for field operations. This Laboratory shall provide evidence that it meets the applicable requirements in ASTM C1077, pertaining to testing hardened concrete cylinders, for a concrete testing laboratory, including curing facilities, testing equipment, technician proficiency, participation in the Cement and Concrete Reference Laboratory (CCRL) Concrete

Proficiency Sample Program (PSP), Quality Management System documentation, and recordkeeping. The only test required for these laboratories, in the CCRL Concrete PSP, is ASTM C39 (AASHTO T22), but it is recommended that the laboratory perform all the field test portions of these Proficiency Samples and maintain the results of these tests, in order to evaluate any root cause issues pertaining to compressive strength. Each Laboratory shall be inspected and evaluated initially, and at least once every regular inspection tour cycle (approximately 30 months) by the CCRL. The ASTM standards pertaining to testing concrete cylinders, with which the subject laboratory must comply, include ASTM C39 (AASHTO T22), ASTM C617 (AASHTO T231) or ASTM C1231, and ASTM C511 (AASHTO M201). The Personnel Qualification requirements in Section 6 of ASTM C1077 regarding PE direction, Laboratory Supervisors, and concrete laboratory personnel testing certifications also apply, except that a Laboratory Supervisor with at least five years' experience in construction materials testing shall be a permissible substitution for the licensed professional engineer. Subsequent documentation shall be provided to the Division showing that the subject Laboratory and personnel meet the applicable requirements of ASTM C1077, pertaining to testing concrete cylinders, for a concrete laboratory. In addition any laboratory conducting concrete surface resistivity testing must be evaluated by CCRL for AASHTO T358.Any Laboratory which desires to test Contractor hardened concrete QC specimens on WVDOH projects shall submit the evidence/documentation, required in Section 4.2.4.2, confirming compliance with ASTM C1077, with regards to testing concrete cylinders, to MCS&T Division at the following e-mail address: DOHMCSnTconcretelab@wv.gov. MCS&T Division will review this submittal. In this submittal, the subject Laboratory shall also explain how all deficiencies noted in the CCRL Laboratory Inspection Report have been addressed. All deficiencies noted in the CCRL Laboratory Inspection Report shall be resolved to the satisfaction of the Division within 90 days from the date of the CCRL Laboratory Inspection Report. Once MCS&T Division determines that the subject Laboratory is in compliance with the applicable requirements of ASTM C1077, and all deficiencies have been adequately resolved, that Laboratory will be placed on the Division's Approved List of Concrete Cylinder Testing Labs. All laboratories which test contractor hardened concrete QC specimens on WVDOH projects must be listed on the Division's Approved List of Concrete Cylinder Testing Labs. Laboratories that are certified to run AASHTO T358 will be indicated by an asterisk associated to the applicable footnote on the APL. A listing of these laboratories is available on the WVDOH MCS&T Webpage[1]. All Division Approved Laboratories shall provide the Division with the CCRL Lab Number for their laboratory and agree to allow DOH, CCRL, and AASHTO re:source to freely share information about assessment reports, proficiency samples, corrective actions, quality management system, and personnel competency and certification records.

[1] https://transportation.wv.gov/highways/mcst/Pages/APL_By_Number.aspx

5.2.6 When calculating the compressive strength of concrete cylinders in accordance with AASHTO T22, the following procedure shall be used:

$$CS = \frac{ML}{0.25 \times \pi \times D^2}$$

Where:

CS = Compressive Strength of the specimen
ML = Maximum load carried by the specimen during the test
π = Mathematical constant PI
D = Diameter of the cylinder being tested (in accordance with AASHTO T 22)

Note: The calculation for CS shall be performed in one continuous step (without any rounding), either by the testing machine, or by calculating device, and only the final value (CS) is permitted to be rounded (to the accuracy specified in AASHTO T 22). The value for π shall be the manufacturer's pre-programmed value in a calculating device or the testing machine.

5.2.7 Miscellaneous Concrete:

The contractor is not required to perform the process control testing required by Part C of Table 1 of the Attachment on miscellaneous concrete (as defined in section 4.2.6.1), provided that the concrete in question is being supplied by an A1 or A2 plant (as defined in MP 601.05.50, formerly numbered as IM-18), and provided that the requirements of section 4.2.6.2 are met for each project on which the reduced testing of miscellaneous concrete is applied.

5.2.7.1 Miscellaneous concrete shall be defined as relatively small quantities, not exceeding 25 yd^3 per day, incorporated into items that will not adversely affect the traffic carrying capacity of a completed facility. Such items would not include any concrete intended for major structures, permanent mainline or ramp pavements, or any other structurally critical items part of, or adjacent to the roadway.

The following items are suggested as a guideline in establishing items that may be categorized as miscellaneous concrete:
Note: Concrete testing for certain items below is waived, in some cases, by the referenced section of the specifications.

1 Sidewalks
2. Curb and Gutter
3. Slope walls for under drain outlet pipes
4. Temporary pavements and pipe crossings
5. Building floors
6. Slope paving and headers
7. Paved ditch or gutter

8. Small (less than 36" diameter) culvert headwalls
9. Catch basins, manhole bases, inlets, and junction boxes (and adjustments of such items) not located in the roadway
10. Foundations for breakaway supports
11. Utility trench fills
12. Cast-in-place survey markers

5.2.7.2 One sample per two days of production (for the same project) shall be tested (beginning on the first day of production) for compressive strength, air content, and consistency. On a minimum of ten percent of the samples outlined above, the Division will observe the batching operation at the plant (that is producing the concrete to be sampled) and check the operational control.

5.2.7.3 When placing miscellaneous concrete and no testing is required, an Approved Source Sample will be generated in SiteManager. The C###### representing the test from the previous day of production shall be entered in the intended use field. Miscellaneous Concrete will be entered in remarks. Miscellaneous Concrete will be written on all batch tickets for which testing is not required, per the miscellaneous concrete provisions of this MP, prior to scanning and placing in ProjectWise.

5.2.8 Documentation:

The Contractor shall maintain adequate records of all inspections and tests. The records shall indicate the nature and number of observations made, the number and type of deficiencies found, the quantities approved and rejected, and the nature of corrective action taken as appropriate. The Contractor's documentation procedures will be subject to the review and approval of the Division prior to the start of the work and to compliance checks during the progress of the work.

5.2.9 Charts and Forms:

All conforming and non-conforming inspections and test results shall be kept complete and shall be available at all times to the Division during the performance work. Forms shall be on a computer-acceptable medium where required. Batch ticket data shall be documented in accordance with the applicable section of MP 601.03.50, with a copy to be submitted to the District Materials Section within 72 hours of the concrete placement. Gradation data shall be documented on WVDOH form T300 using the material codes listed in the online computer systems user guide. The original gradation data shall be submitted to the District Materials Section within 72 hours of obtaining the gradation sample. Test data for (PCC) shall be charted in accordance with the applicable requirements of MP 601.03.52. Gradation test data shall be plotted in accordance with the applicable requirements of MP 300.00.51. The Contractor may use other types of control charts as deemed appropriate by the Division. It is normally expected that testing and charting will be completed within 48 hours after sampling.

The Contractor shall also ensure that all Material Suppliers prepare and submit the HL-441 form (weekly supplier report) in a timely manner

5.2.9.1 All charts and records documenting the Contractor's quality control inspections and tests shall become property of the Division upon completion of the work.

5.2.10 Batch Tickets

Each batch of Structural Concrete, including miscellaneous concrete (as defined in section 4.2.6.1), delivered at the project shall be accompanied by one batch ticket with all of the items of information listed in Section 4.2.9.1 pre-populated on the ticket. In the case of (PCC) Pavement, each batch of concrete delivered at the project on which a test in accordance with Table 1 of Attachment 1 is to be performed shall be accompanied by a batch ticket. This batch ticket shall have all of the items listed in section 4.2.9.1 pre-populated on the ticket unless non-agitator trucks or truck agitators are used. In this case, the batch ticket shall have all of the items listed in section 4.2.9.2 pre-populated on the ticket.

5.2.10.1 All batch tickets for Structural Concrete and (PCC) Pavement Concrete transported by truck mixers shall have all the following items pre-populated on the ticket:

1. Producer/Supplier Code
2. Producer/Supplier Name
3. Producer/Supplier Location
4. Mix Design Laboratory Reference Number
5. Date
6. Sequence Number
7. Volume (yd^3/m^3)
8. Time Batched
9. Contract Identification Number (CID #)
10. Federal Project Number (If applicable)
11. State Project Number
12. Material Code/Name
13. Water Allowed (gal/L)
14. Water at Plant (gal/L)
15. Weight of Ice at Plant (lb/kg)
16. Weight of Cement (lb/kg)
17. Supplementary Cementitious Material(s) (SCM) (lb/kg)
18. Weight of Fine Aggregate (lb/kg)
19. Weight of Coarse Aggregate (lb/kg)
20. *Admixture Name(s) and Dose (oz/L)
21. Cylinder I.D.
22. Initial Counter
23. Target Consistency (in/mm)
24. Target Air (%)
25. License Number of Haul Unit.

* If admixtures are added at the jobsite, these shall be entered by the project.

The following information shall be documented on the ticket by the project:

1. Contract Item Number
2. Contract Line Number
3. Time Unloaded
4. Water at Job (gal/L)
5. Concrete Temperature (^{o}F/^{o}C)
6. Final Counter
7. Actual Consistency (in/mm)
8. Actual Air (%)

5.2.10.2 All batch tickets for concrete delivered by means of non-agitator trucks or truck agitators shall have all of the following items pre-populated on the ticket:

1. Producer/Supplier Name
2. Mix Design Laboratory Reference Number
3. Date
4. Sequence Number
5. Volume (yd^3)
6. Time Batched
7. ~~7.~~ Contract Identification Number (CID #)
8. Federal Project Number (If applicable)
9. State Project Number
10. Material Code/Name
11. Water Allowed (gal/L)
12. Water at Plant (gal/L)
13. Weight of Ice at Plant (lb/kg)
14. Weight of Cement (lb/kg)
15. Weight of SCM (lb/kg)
16. Weight of Fine Aggregate (lb/kg)
17. Weight of Coarse Aggregate (lb/kg)
18. *Admixture Name(s) and Weight(s) (oz/L)
19. Target Consistency (in/mm)
20. Target Air (%)
21. License Number of Haul Unit.

* If admixtures are added at the jobsite, these shall be entered by the project

The following information shall be documented on the ticket by the project:

1. Item Number
2. Line Number
3. Time Unloaded
4. Temperature (°F/°C)
5. Actual Consistency (in/mm)
6. Actual Air (%)

5.2.10.3 The batch ticket in the case of either type of concrete shall be a batch ticket prepared by the plant. This ticket must be computer generated with blank fields provided in which all of the required data shall be recorded. The data items listed above that are completed in the field (such as Time Unloaded, Actual Consistency, etc.) must have a field on the batch ticket for completion. Volume is to be reported to the nearest 0.01 yd^3. Consistencies are to be reported to the nearest 0.25 inch. Target and Actual Air are to be reported to the nearest 0.1% (to the nearest 0.25% if the volumetric method is used).

5.2.10.4 As per the requirements of Section 109.20.1 of the Specifications, an E-Ticket shall be provided to meet these requirements.

5.2.11 Corrective Action:

The Contractor shall take prompt action to correct conditions, which have resulted, or could result, in the submission to the Division of materials and products, which do not conform to the requirements of the Contract documents.

5.2.12 Non-Conforming Materials:

4.2.11.1 The Contractor shall establish and maintain an effective and positive system for controlling non-conforming material, including procedures for its identification, isolation and disposition. Reclaiming or reworking of non-conforming materials shall be in accordance with procedures acceptable to the Division. All non- conforming materials and products shall be positively identified to prevent use, shipment, and intermingling with conforming materials and products. Holding areas, mutually agreeable to the Division and the Contractor shall be provided by the Contractor.

5.2.13 Types of QC Plans:

5.2.13.1 QC Plans which are intended for use on more than one project shall be defined as Master QC Plans. Section 4.3 outlines the procedures for Master QC Plan submittal and approval.

5.2.13.2 QC Plans which are intended for use on a single project shall be defined as Project Specific QC Plans. Project Specific QC Plans shall contain a cover letter which includes the following: project description, CID#, Federal and/or State Project Number.

5.2.13.3 A Contractor may submit a Master QC Plan for Plant and/or Field operations instead of a Project Specific QC Plan.

5.2.13.4 Once any QC Plan is approved for a project, the key date shall be entered in SiteManager by the appropriate District Materials personnel. The first date entered shall be the date the Project QC Plan letter is received. The second date shall be when the District approves the QC Plan for use on the project.

5.3 Master QC Plan

5.3.1 The intent of Master QC Plans is to facilitate the approval process in a more uniform manner. Master QC Plans can be submitted to the Division by the Contractor when their workload in a given District is routinely repetitive for the year.

5.3.2 The Contractor shall submit a Master Field QC Plan yearly to each District in which they have work (see Attachment 2). If the Contractor does not have work in a given District for the year, then a Master Field QC Plan does not need to be submitted to that District.

5.3.3 The Producer/Supplier shall submit a Master Plant QC Plan at the beginning of each year to the District in which their plant is located (see Attachment 3).

5.3.4 The District will review the submitted Master QC Plans to see if they meet the applicable requirements of Sections 4.2 thru 4.2.11.1 and assign a Laboratory Reference Number to each QC Plan upon approval, for future referencing. The District will acknowledge approval of each Master QC Plan to the Contractor and/or Producer/Supplier by letter (see Attachment 4), which will include the Laboratory Reference Number and a copy of the approved Master QC Plan. This will then be scanned and placed in ProjectWise under the appropriate District's Org for that Contractor and/or Producer/Supplier.

5.3.5 Once a project has been awarded, if a contractor elects to use the approved Master Plant and Master Field QC Plans on that project, the Contractor shall submit a letter requesting to use the Master QC Plans for that project. This letter must be on the Contractor's letterhead, be addressed to the District Engineer/Manager or their designee, and contain the following information: project number, CID#, project description, type of Quality Control Plan and the laboratory reference number for the Master QC Plan. See Attachment 5 for an example of a plant letter and Attachment 6 for an example of a field letter.

5.3.5.1 The District shall review the referenced Master QC Plans to ensure they cover all items in that project. If the referenced Master QC Plan is found to be insufficient for some items on that project, the District shall request the Contractor to submit additional information for quality control of those items as an addendum on a project specific basis. When the District is satisfied with the QC Plan for that project, a letter shall be sent to the Contractor acknowledging approval (see Attachment 7), with the following

attached: the contractor's project QC Plan request letter and the Master QC Plan approval letter. This shall then be placed in the project's incoming-mail mailbox in ProjectWise.

5.3.5.2 A Master QC Plan that has been approved for project use shall be good for the duration of that project.

5.3.5.3 For the use of Division Personnel, the District approval letter for this project must state the ProjectWise link to the referenced Master QC Plan for that Contractor (for example: WVDOT ORGS > District Organization #> Materials > Year > Master QC Plans).

5.3.6 The Master Field and Plant QC Plans shall be valid for the duration of one calendar year beginning on January 1st and ending on December 31st. The Master Plant QC Plan will also cover maintenance purchase order concrete for the year.

6. ACCEPTANCE SAMPLING AND TESTING

6.1 Acceptance sampling and testing is the responsibility of the Division. Quality control tests by the Contractor may be used for acceptance.

6.2 The Division shall sample and test for applicable items completely independent of the contractor at a frequency equal to approximately ten (10) percent of the frequency for testing given in the approved QC Plan. Witnessing the contractor's sampling and testing activities may also be a part of the acceptance procedure, but only to the extent that such tests are considered "in addition to" the ten (10) percent independent tests.

6.3 Results from independent tests conducted by the Division for gradation, entrained air, consistency, and strength will be plotted on the Contractor's quality control charts with a red circle but are not to be included in the moving average. When the Contractor's tests are witnessed, the results are circled on the control chart in red and are to be included in the moving average calculations.

6.4 Results from both independent tests and witnessed tests will be evaluated in accordance with MP 700.00.54. If a dissimilarity is detected, an investigation shall be immediately initiated to determine the cause of the dissimilarity.

7. ABSENT TESTING OF MATERIAL

7.1 If the Contractor fails to perform testing of the material in accordance with the Contractor's Division Approved Quality Control Plan, payment for the portion of the item represented by the absent test shall be withheld, pending the Engineer's decision whether or not to allow the material to remain in place. Testing includes both performing the test and submitting the results as per MP 109.00.21.

7.1.1 If the Engineer allows the material to remain in place, the Division shall not pay for the material represented by the absent test. However, the Division shall pay for the cost of the placement of the material, including labor and equipment. The invoice or material supplier cost (if applicable), determined at the time of shipment, shall be used to calculate the cost of material when evaluating the total cost of labor and equipment.

Michael Mance Digitally signed by Michael Mance
Date: 2024.08.23 10:03:05 -04'00'

Michael A. Mance, P.E.
Interim Director
Materials Control, Soils and Testing Division

MP 601.03.50 Steward – Cement and Concrete Section
MM:T
ATTACHMENTS

TABLE 1
CONTRACTORS PROCESS CONTROL REQUIREMENTS
STRUCTURAL CONCRETE AND
PORTLAND CEMENT CONCRETE PAVEMENT

	Minimum frequency*
A. PLANT AND TRUCKS	
1. Mixer Blades	Prior to Start of Job and Weekly
2. Scales	
a. Tared	Daily
b. Calibrate	Prior to start of Job
c. Check Calibration	Weekly
3. Gauges and Meters-Plant and Truck	
a. Calibrate	Yearly
b. Check Calibration	Weekly
4. Admixture Dispenser	
a. Calibrate	Prior to Start of Job
b. Check Operation and Calibration	Daily
B. AGGREGATES	
1. Fine Aggregate	
a. Gradation	Per section 601.3.2.4 of the Specifications
b. Moisture	Daily

2. Coarse Aggregates

a. Gradation	Per section 601.3.2.4 of the Specifications
b. Percent passing No. 75µm	Daily
c. Ā for Combined Coarse Aggregates Fine Aggregates and Cement	Per section 601.3.2.4 of the Specifications
d. Moisture	Daily

3. Optimized Aggregates

a. Gradation	Per section 601.3.2.4.1 of the Specifications
b. Moisture	Daily

C. PLASTIC CONCRETE

1. Entrained Air Content

Pavement Concrete	Two at the beginning of the paving operation, per Section 501.4.2, then one per 500 yd^3 (380 m^3) or fraction thereof, with a minimum of two per day
Structural Concrete (except Bridge Superstructure)	One per 100 yd^3 (75 m^3) or fraction thereof, with a minimum of one per ½ day of operation
Bridge Superstructure	One per batch

2. Consistency**

Pavement Concrete	One per 500 yd^3 (380 m^3) or fraction thereof, with a minimum of two per day
Structural Concrete (except Bridge Superstructure)	One per 100 yd^3 (75 m^3) or fraction thereof, with a minimum of one per ½ day of operation

	Bridge Superstructure	One for first batch and one for every fifth batch thereafter
3.	Temperature	Per Specification
4.	Yield	
	Pavement Concrete	Per Section 501.3 of the Specifications and one for each five days of operation after the first five days of operation
	Structural Concrete	Per Section 601.3.2.3 of the Specifications and one for each ten sets of cylinders after the first ten
5.	Compressive Strength***	
	Pavement Concrete	One set of concrete cylinders for each 350 yd^3 (270 m^3) or fraction thereof
	Structural Concrete	For each class concrete delivered and placed on a calendar day from a single supplier, one set of concrete cylinders for each 100 yd^3 (75 m^3) or fraction thereof
6.	Permeability	
	Pavement Concrete	N/A
	Structural Concrete	Per Section 601.4.5 of the Specifications
	Specialized Concrete Overlays	Per Section 679.2.2 of the Specifications

Typo - this was 75 instead of 270

* Frequency for Process Control will vary with the size and type of aggregate or mixture and the batch-to-batch variability of the item.

** When superplasticizer is added to the concrete in the field, additional consistency testing is required as per Section 601.3.2.1 of the Specifications.

*** All cylinders shall be made, cured, and shipped to the Laboratory in accordance with AASHTO R 100 and MP 601.04.20. They shall be tested in accordance with AASHTO T 22 and the applicable section of the Specifications.

Example
COMPANY LETTERHEAD

Mr./Ms./Mrs. _____
West Virginia Department of Highways
District ___ Engineer/Manager
_____, WV #####

RE: Master PCC Field QC Plan

Dear _____,

We are submitting our PCC Field Quality Control Plan, developed in accordance with Sections 501 and 601 of the (year) WVDOH Standard Specifications, the (year) WVDOH Supplemental Specifications, and MP 601.03.50.

1. The Quality Control program is under the direction of_____, who can be contacted in Field/Office, by telephone number _____, cell#_____, and/or e-mail address _____.

2. Sampling and testing will be performed by qualified personnel as per WVDOH specifications Section 106.

3. Class(es) of Concrete to be controlled are listed as follows:

   - All types Class A - All types Class B - All types Class C

   - All types Class D - All types Class K - All types Class H

   - Etc.

4. All items in this QC Plan will be sampled at a minimum frequency as specified in Table 1 of Attachment 1. We acknowledge that additional sampling may be required by the Division in addition to the minimum frequency stated.

5. All sampling and testing will be in accordance with the methods and procedures required by the Specifications. All measuring and testing equipment shall be standard and properly calibrated as per the specified test procedure. *(If alternative sampling methods, procedures and inspection equipment are to be used please state in detail what they are and how they will be utilized.)*

6. Batch ticket data shall be documented in accordance with the applicable section of MP 601.03.50, with a copy to be submitted to the District Materials Section within 72 hours of the concrete placement.

7. Calculation of the compressive strength of concrete cylinders will be done as shown in Section 5.2.5 of MP 601.03.50.

8. Testing of Miscellaneous Concrete will be as specified in Section 5.2.6 and Sub-Sections 5.2.6.1 thru 5.2.6.3 of MP 601.03.50.

9. We will maintain adequate records of all inspection and tests. The records will indicate the type of test, number of observations made, the amount and type of deficiency's found, the quantities approved and rejected, and the nature of corrective actions taken as appropriate.
   Our documentation procedures will be subject to the review and approval of the Division prior to the start of the work and to compliance checks during the progression of the work.

10. Our company will take prompt action to correct conditions, which have resulted or could result, in the submission to the Division/District of materials and products, which do not conform to the requirements of the contract documents.

11. Non-Conforming Materials -- *State how you will establish an effective and positive system for controlling non-conforming material. This shall include the following:*

    - procedures for non-conforming material identification
    - isolation and disposition of this material

    Reclaiming or reworking of non-conforming materials shall be in accordance with procedures acceptable to the Division.
    Our company will specify and provide holding areas, which shall be mutually agreeable by the Division and Contractor.

Very Truly Yours,

_____
Company Official, Title

Example
COMPANY LETTERHEAD

Mr./Ms./Mrs. _____
West Virginia Department of Highways
District ___ Engineer/Manager
_____, WV #####

RE: Master PCC Plant QC Plan

Dear _____,

We are submitting our PCC PLANT Quality Control Plan, developed in accordance with Sections 501 and 601 of the (year) WVDOH Standard Specifications, the (year) WVDOH Supplemental Specifications, and MP 601.03.50.

1. The Quality Control program is under the direction of_____, who can be contacted in Field/Office, by telephone number _____, cell#_____, and/or e-mail address _____.

2. Sampling and testing will be performed by qualified personnel as per Specifications Section 106.

3. The PCC Mix Designs and class of concrete to be controlled are listed below:

	Mix Design Number	Class of Concrete
1.	#######	Class B
2.	_____	_____
3.	_____	_____
4.	_____	_____
Etc.		

4. All items in this QC Plan will be sampled at a minimum frequency as specified in Table 1 of Attachment. We acknowledge that additional sampling may be required by the Division in addition to the minimum frequency stated.

5. All sampling and testing will be in accordance with the methods and procedures required by the Specifications. All measuring and testing equipment shall be standard and properly calibrated as per the specified test procedure. *(If alternative sampling methods, procedures and inspection equipment are to be used please state in detail what they are and how they will be utilized.)*

6. Charts and forms
Our Company will make sure all conforming and non-conforming inspections and test results shall be kept complete and shall be available at all times to the Division during the performance work. Forms shall be on a computer-acceptable medium where required. Gradation data shall be documented on WVDOH form T300 using the material codes listed in the online computer systems user guide. The original gradation data shall be submitted to the District Materials Section within 72 hours of obtaining the gradation sample. Test data for Portland cement concrete shall be charted in accordance with the applicable requirements of MP 601.03.52. Gradation test data shall be plotted in accordance with the applicable requirements of MP 300.00.51. We may use other types of control charts as deemed appropriate by Division. It is normally expected that testing and charting will be completed within 48 hours after sampling. Our Company shall also ensure that all Material Suppliers prepare and submit the HL-441 form (weekly supplier report) in a timely manner. All charts and records will be turned over to the Division upon completion of work for a given WVDOH project.

7. *State that batch tickets will conform to requirements of MP 601.03.50 Section 5.3.9 and its applicable subsections.*

8. Our company will take prompt action to correct conditions, which have resulted or could result, in the submission to the Division of materials and products, which do not conform to the requirements of the contract documents.

9. Non-Conforming Materials - *State how you will establish an effective and positive system for controlling non-conforming material. This shall include the following:*

- procedures for non-conforming material identification
- isolation and disposition of this material

Reclaiming or reworking of non-conforming materials shall be in accordance with procedures acceptable to the Division.
Our company will specify and provide holding areas, which shall be mutually agreeable by the Division and Contractor.

Very Truly Yours,

_____
Company Official, Title

WVDOH District Master QCP Approval Letter
*** EXAMPLE ***
WVDOH LETTERHEAD

ACME Company
20 First St.
Somewhere, WV #####

RE: PCC Plant or PCC Field *(whichever is applicable)*
Master QC Plan
Description: (YEAR)
P/S code: (only if a plant QCP)

Dear Sir,

Your Quality Control Plan (M#-#####) for _____has been reviewed and found to be acceptable for the following items:

- All WVDOH approved Designs for PCC Classes of Concrete controlled by the referenced QC plan.

As work progresses throughout the season an addendum(s) may be required to this QCP to keep the QC program current. Also note that personnel may be required to show proof of certification for testing. Please use Lab Reference # M#-###### when corresponding about this QC plan. Please make sure that all appropriate personnel have a copy of this plan in their possession.

Very truly yours,

_____
Name, Title

Example
COMPANY LETTERHEAD

Mr./Ms./Mrs. _____
WV Department of Highways
District ___ Engineer/Manager
_____, WV #####

RE: PCC Quality Control Plan
for Plant ---- Project

Federal Project No. _____
State Project No. _____
Contract ID No. _____
Description _____

Dear Mr./Ms./Mrs. _____,

We would like to use our Producer/Supplier's name Master PCC Plant QC Plan, reference number _____ for the project referenced above. All PCC items on the referenced project are covered by the Master PCC Plant QC Plan. *(if needed state the Special Provision and that the addendum is attached for Quality Control of Special Provision Item)*

The Quality Control Plan is under the direction of _____, _____(title), and will be the company's contact representative to the Division of Highways District Materials and Construction Departments. They can be contacted in person at the plant, by telephone _____or at e-mail at _____.

Very truly yours,

_____

Company Representative

Example
COMPANY LETTERHEAD

Mr./Ms./Mrs. _____
WV Department of Highways
District ___ Engineer/Manager
_____, WV #####

Re: PCC Quality Control Plan
for Field ---- Project

Federal Project No. _____
State Project No. _____
Contract ID No. _____
Description _____

Dear Mr./Ms./Mrs. _____,

We would like to use our approved Master PCC Field QC Plan, reference number _____ for the project referenced above. All PCC items on the referenced project are covered by the Master PCC Field QC Plan. *(if needed state the Special Provision and that the addendum is attached for Quality Control of Special Provision Item)*

The Quality Control Plan is under the direction of _____, _____(title), and will be the company's contact representative to the Division of Highways District Materials and Construction Departments. They can be contacted in person at the plant, by telephone _____or at e-mail at _____.

Very truly yours,

_____

Company Representative

WVDOH District Master QCP Approval Letter
*** EXAMPLE ***
WVDOH LETTERHEAD

ACME Company
20 First St.
Somewhere, WV #####

RE: PCC Field or PCC Plant *(whichever is applicable)* QC Plan

Project CID#: ########
Fed/State Project #: NHPP- ## - ####-##
Description: Falling Slide
County: XXXXXXX
P/S Code: (If a Plant)

Dear Sir,

Your request to use Master Quality Control Plan (M# - ######) for PCC Plant or PCC Field (*whichever is applicable)* on the project referenced above, has been reviewed and found to be acceptable for the following items:

- All WVDOH approved designs and classes of PCC controlled by this QCP listed below:

- Class B - Class B modified - Class K -etc.

As work progresses throughout this project an addendum(s) may be required to this QCP to keep the QC program current. Please use M# - ###### when corresponding about this QC Plan. Also note that personnel may be required to show proof of certification for testing. Please make sure that all appropriate personnel have a copy of this plan in their possession.

For Division Reference: The Master Quality Control Plan can be reviewed in ProjectWise at the folder shown below:
WVDOH ORG>D0#>year>MASTER QC PLANS>Contractors or Plant>Company >folder>Name of file (i.e.: 2016 04 05 M#160001 PCC Plant QCP)

Very truly yours,

_____
Name, Title

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES FOR PRECAST CONCRETE PRODUCTS

1. PURPOSE

1.1. To set forth procedures for the inspection and acceptance of precast concrete products, including inlets, manholes, box culverts, 3-sided bridge units, retaining wall panels, headwalls, wingwalls, lagging, junction boxes, and any other precast products, and the approval of the plants at which they are fabricated.

2. SCOPE

2.1. This procedure will apply to all precast concrete products supplied for use on West Virginia Division of Highways projects and to all precast concrete product fabricators that supply material for use on West Virginia Division of Highways projects.

2.2. For prestressed concrete members refer to MP 603.10.40 “Inspection and Acceptance Procedure for Prestressed Concrete Bridge Beams.”

3. FABRICATOR APPROVAL

3.1. All precast concrete product fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin to initiate the approval process.

3.2. In order for a Fabricator to be approved and listed on the WVDOH Approved List of Precast Concrete Fabricators, they must be NPCA (National Precast Concrete Association) certified, QCAST (American Concrete Pipe Association) Certified, or have an equivalent type of certification.

3.2.1. All fabricators must set up their invoicing as an E-Ticket that meets the requirements of Section 109.20.1 of the Standard Specification prior to approval.

3.3. The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the fabrication facility, the Quality Control (QC) lab, and meet with QC and other key

personnel from the Fabricator. Component materials which will be used in the fabrication of precast items shall be sampled for testing. Batch scales shall be calibrated in accordance with MP 700.00.03 at a minimum once per year.

3.3.1. Sampling and testing of component materials shall be done in accordance with MP 603.02.10. Copies of recent component delivery tickets should be presented on the day of sampling. All component materials must be approved prior to the start of fabrication.

3.3.1.1. Any Fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the Approved Fabricator list. After removal from the approved list, before a Fabricator can again produce for the WVDOH, they must repeat the approval process. Sampling of component materials will not continue when the plant is not listed on the Approved Fabricator list.

3.3.2. Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedure (MP's), Standard Details, and QC/QA Inspections shall be addressed at this meeting.

3.3.3. The Fabricator must submit the Quality Control Manual/Plan for review at this meeting.

3.4. All Concrete Mix Designs which will be used on products fabricated for the WVDOH must be submitted for review & approval, prior to the start of fabrication. Any design mix with an aggregate(s) that has a reactivity class~~es~~ R1, R2, or R3, as shown as in Approved Aggregates Source List, shall be developed in accordance with WVDOH specifications, subsection 601.3.1.1. If an aggregate Source is not listed on the Approved Aggregates Source List, the Division will test the fine and coarse aggregate from the Source, in accordance with AASHTO T 303, to determine the reactivity class of the aggregate prior to its use on any WVDOH project. The Division will inform the Fabricator of the reactivity class of aggregates that they are proposing to use. If a cement Source and/or a SCM Source are not listed on the Approved Source List, the Division will test cement and/or SCM from that Source prior to its use on any WVDOH project.

3.5. The Fabrication Plant QC Personnel, as a minimum, shall be a certified ACI Grade I Concrete Field Testing Technician and/or a WVDOH PCC Inspector. In addition, if Self-Consolidating Concrete (SCC) is used, Fabrication Plant QC Personnel shall be a certified ACI SCC Testing Technician.

3.6. All Precast Concrete items shall be accepted by Direct or Master Coverage except when a Fabricator is certified as an Approved Source of concrete lagging as defined in Section 7.

4. FABRICATION & INSPECTION OF PRODUCTS FOR DIRECT & MASTER COVERAGE

4.1. Prior to beginning fabrication of any precast concrete products, the Fabricator shall provide written or email notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin.

4.1.1. Depending upon the precast items being fabricated, MCS&T Division may choose to monitor fabrication. Fabrication of structurally significant products such as box culverts and 3-sided bridge units shall be monitored. Other items may be monitored at the discretion of MCS&T.

4.1.2. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.

4.2. Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to start of any work by the Fabricator.

4.3. Concrete cylinders shall be made for compressive strength testing with 6-inch by 12-inch or 4-inch by 8-inch molds. The cylinders are to be cured in the same area as the products for which they represent (Field Cured as outlined in AASHTO R100) until tested to create a curing environment similar to the product that they represent. A compressive strength test shall consist of the average result of a set of cylinders, which is at least two cylinders. Form removal for wet cast concrete is not permitted until concrete has reached 50% of the design strength, unless otherwise specified. If forms are stripped from box culverts at 50% of the design strength, another curing method from section 601.12, or ASTM C1577 must be used until 70% of the design strength is obtained. Form removal limitations do not apply to elements fabricated with dry cast concrete. Dry cast concrete is defined as concrete with a slump less than 1-inch.

4.3.1. For both conventional wet cast concrete and SCC mixes, a minimum of one set of compressive strength cylinders shall be fabricated from every 7 yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. Both the form removal strength and the 28-day strength must be confirmed by a set of cylinders. Cylinders shall be the same size as those used in the initial approved mix design. For conventional concrete, slump, temperature, and air content tests shall be conducted on the first batch of concrete each day and every time that cylinders are fabricated. For SCC mixes, spread, temperature, and air content tests shall be conducted on every batch. For all types of concrete, unit weight and yield tests shall be conducted on the first batch of concrete each day and thereafter as deemed necessary by Quality Control and Quality Assurance Personnel.

4.3.2. For dry cast mixes, the 28-day strength shall be confirmed by a set of compressive strength cylinders. Compressive strength testing for form removal is not required for dry cast mixes. A minimum of one set of 28-day compressive strength cylinders shall be fabricated from every 14 yards of concrete, or fraction thereof, with a minimum of one set per day per mix design. ~~for each item fabricated.~~ The cylinders are to be fabricated in the molds on the vibration table in accordance with ASTM C497. For dry cast mixes, slump testing is not required, and concrete temperature testing shall be performed on the first batch of concrete each day and every time that cylinders are fabricated.

4.4. For precast manholes fabricated with wet cast and SCC mixes, absorption tests are to be conducted in accordance with ASTM C642. Tests should be conducted on a weekly basis for each mix design used, at a minimum, unless otherwise specified.

4.5. For precast products fabricated with dry cast mixes, absorption tests are to be conducted in accordance with ASTM C642, and tests should be conducted on a weekly basis for each mix design used. The maximum allowable absorption shall be 9%.

4.6. Unless otherwise specified, for conventional wet cast and SCC mixes, plastic concrete shall have an air content measured at 7.0 ± 2.0%. For dry cast concrete, the air content test requirement is waived.

4.6.1. Prior to the use of Self-Consolidating Concrete in precast items all mix designs must be submitted to MCS&T for approval and meet the requirements of the following table. Test results from trial batches produced by the laboratory which designed it shall be included in the submittal. The compressive strength of the design mix shall be at least 15% above the specified design strength.

Table 4.6.1 - SCC Mix Design Acceptance

Fresh Property	**Mix Design Batch Acceptance Criteria**
Air Content	7.0± 1.5%
Spread (ASTM C1611)	Target ± 1.5 inches 2 seconds $\leq T_{50} \leq$ 7 seconds Visual Stability Index ≤1.0
Passing Ability (ASTM C1621)	J-Ring Value $\leq$ 1 inch
Segregation Resistance (ASTM C1610)	Segregation ≤ 12%
Unit Weight and Yield	±2% of Theoretical

4.6.2. The following table lists the criteria for SCC production.

Table 4.6.2 - SCC Production Acceptance

Fresh Property	**Production Acceptance Criteria**
Air Content	7.0± 2.0%
Spread (ASTM C1611)	Target ± 2 inches 2 seconds $\leq T \leq$ 7 seconds Visual Stability Index ≤1.0
Concrete Temperature	<90°F
Unit Weight and Yield	±2% of Theoretical

4.6.3. SCC should only be given minimal vibration; and shall not be dropped from a distance greater than 4 feet relative to the top of the form.

4.6.4. Precast products fabricated with dry cast concrete shall be limited to a maximum wall thickness of 12 inches when single sided vibration is used and 18 inches when double sided vibration is used.

5. FINAL INSPECTION

5.1. After fabrication is completed and prior to shipment, the precast items will be stored on dunnage. The Fabricator shall provide MCS&T Division with a written or email request for final inspection a minimum of one calendar week prior to the desired date of inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is the key to avoiding any scheduling conflicts regarding final inspection.

5.2. At the final inspection, the fabricator shall provide the inspector with documentation of required data pertinent to the product(s) being produced. Attached to this document is a sample inspection sheet to be used as a guide for presenting this information. This documentation is also available on the MCS&T Division Website[1].

5.2.1. For the final inspection, the Inspector may witness compressive strength tests if required, inspect repairs as needed, and conduct a thorough visual examination of each member. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.

5.2.2. For box culverts, trial fitting of adjacent pieces, prior to shipping, will be required as part of the final inspection process. Each adjacent box culvert will be trial fitted in pairs

[1] https://transportation.wv.gov/highways/mcst/Pages/WVDOH-Materials-Procedures.aspx

horizontally or vertically; the gaps between each pair will be measured. Dunnage will be placed on a smooth level surface below the bottom of the culvert to prevent damage. The maximum gap between the adjacent pieces shall not exceed ½ inch (13 mm), unless otherwise stated in the construction plans.

6. ACCEPTANCE & REJECTION

6.1. Upon completion of final inspection, if a precast product meets all specification requirements and does not contain any defects, the Inspector will stamp the precast product as accepted by MCS&T Division and provide a 7-digit Laboratory Reference Number for shipment.

6.1.1. Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an E-Ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

6.2. If, however, the precast product does not meet all specification requirements due to damage, defect, or dimensional tolerance, the product must be further evaluated before potential acceptance by the MCS&T Division as described in the following subsections.

6.2.1. Minor defects may be repaired in accordance with the pre-approved repair procedures which should be incorporated within the Fabricator QC Plan. Cracks 4 mils or less shall be sealed by silane; and cracks between 4 mils and 16 mils shall be repaired by epoxy injection in accordance with Section 603.10.2. Any crack exceeding 16 mils shall be considered a major defect and the item shall be rejected by MCS&T. If repairs have been approved, and appear satisfactory and all other specifications are met, the Inspector shall stamp the product as approved for shipment and issue a 7-digit Laboratory Reference Number for acceptance.

6.2.2. Major defects shall include dimensions that exceed tolerances, failure to reach required compressive strength, cracks greater than 16 mils, and any defect that could be considered structural. Lagging dimensions shall be within ± ¼'' from the specified dimension, and all other items must meet relevant tolerances in AASHTO and ASTM Standards. Items with major defects shall be rejected by MCS&T Division, and a 7-digit Laboratory Reference Number will be assigned documenting MCS&T Division's rejection. When items are load bearing, they shall be evaluated by the Designer for structural adequacy and then may be accepted by DMIR, pending concurrence by the District, and or the Engineer of Record. If a product is approved for repair, and if repairs appear satisfactory, the Inspector shall proceed with a final shipping inspection of the piece. Any items found to be not acceptable by the Engineer of Record, Designer, or the District/Division; shall be rejected by the Division.

6.2.3. When an item does not achieve the specified 28-day compressive strength prior to shipment, and if it is accepted by a DMIR, the following formula for the price adjustment shall be used in the DMIR, plus any administrative fee.

f'_c – 28 Day Compressive Strength (psi)
$\overline{X}$ – Average 28 – day Compressive Strength (psi)
IC - The invoiced cost of the precast item only.

Formula 1 (Constructed by Contractor)

$$\text{Price Reduction} = \left[\frac{f'_c - \mathbf{X}}{.5\, f'_c}\right] x\ 40\%\ \text{Unit Bid Price}$$

Formula 2 (Constructed by Division)

$$\text{Price Reduction} = \left[\frac{f'_c - \mathrm{X}}{.5\, f'_c}\right] x\ \mathrm{IC}$$

7. PROCEDURE FOR APPROVED SOURCE OF PRECAST CONCRETE LAGGING

7.1. Precast concrete Fabricators may be classified as an Approved Source of precast concrete lagging if they have met the requirements of Section 3 and are producing lagging which is made in accordance with the relevant WVDOH Standard Details. Once classified as an Approved Source of precast concrete lagging, an Approved Source Lab Number will be assigned to the Fabricator for material tracking.

7.2. MCS&T Division may perform regular quality assurance inspections prior to shipment and/or, monitor fabrication of lagging from a Fabricator that is an Approved Source. The Approved Source Lab Number shall be noted on all shipping documents from the fabricator, and material coverage will be requested under the assigned Approved Source Lab Number. All relevant concrete test data, component material information, QC inspection data, and shipping information shall be kept on file at the Fabricator for the last three years of fabrication and shall be available upon request by the Division. Failure to produce requested documentation may result in revocation of the Fabricator's Approved Source certification status.

7.3. Approved Sources will be evaluated by the Division by random audits. Audits will be conducted on the material that is available to the Inspector at the time of the audit. All documentation and records for the pieces must be made available to the Inspector on the day of the audit and must be complete, current, and accurate. Failure to produce records shall be a cause for decertification.

7.3.1. All shipping documentation, concrete test data, and component material certifications shall be made available to the Inspector for review. These documents shall include all documents from material that has been shipped to state projects since the last audit. If data indicates that any material did not conform to this MP, the applicable Specifications, or Standard Detail; and was used in a state project, then the Fabricator will be de-certified as an Approved Source of precast concrete lagging.

7.3.2. In addition to documentation, the audit will consist of fabrication monitoring, test observance, and a visual inspection of material that is stocked for shipping on the day of the audit.

7.3.2.1. Each material test monitored during the audit must be performed in accordance with the applicable Standards, and Specifications. Visual inspection of stocked material will include quality checks of surface finish for cracks, spalls, and other surface blemishes after all repairs have been performed and dimensional checks. The material shall be properly stored to avoid handling damage and be accessible to the Inspector. Audits shall be graded on a point system deducted from 100 and weighted based on the Non-Conformance Points found per Table 7.3. A minimum score of 75 shall be considered passing.

TABLE 7.3

Audit Category	**Non-Conformance Points**
Material Test Data Review	10 (per error)
Component Material Certification Review	10 (per error)
Shipping Documentation	10 (per error)
Stocked Material Visual Inspection	15 (per defect)
Dimension Check	20 (per error)
Test Performance Check	15 (per Test)

7.4. When a Fabricator, which is an Approved Source, fails an audit, the Fabricator must submit a written corrective action plan to bring their QC program back into compliance with this MP and corresponding Specifications during a probationary period of one month during which time the fabricator must prove they have fulfilled the corrective actions they submitted before supplying the material again. If the Fabricator fails to bring their material back into compliance within the probationary period, the Approved Source status will be revoked for a minimum of one year from the date of the end of the probationary period, or until the Fabricator has corrected the nonconformances listed during the failed audit. Two failing audits in a year shall result in revocation of the Fabricator's Approved Source status for one year from the date of the last failed audit. Any evidence of document falsification shall result in immediate loss of Approved Source status, and removal from the Approved List of Concrete Fabricators for a minimum 2 years. Depending on the severity and the legality of the falsified documents the removal may be permanent.

7.5. Non-Conforming material received by WVDOH projects and reported to MCS&T shall result in an immediate failing audit and will require the Fabricator to submit corrective actions. If the Fabricator fails the subsequent audit, it will result in the loss of their Approved Source status.

Michael A. Mance, P.E.
Interim Director
Materials Control, Soils and Testing Division

MP 604.02.40 Steward – Cement and Concrete Section
MM:T
ATTACHMENT

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION

SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

NPCA (National Precast Concrete Association) Certification _____

CONCRETE COMPONENTS

Mix Design Lab # (if applicable): _____

Cement Source: _____ **Fly Ash Source:** _____

Coarse Aggregate Source 1: _____ **Coarse Aggregate Source 2:** _____

Cement Type: _____ **Approved/Tested:** _____

Fly Ash Type: _____ **Approved/Tested:** _____

Coarse Aggregate 1: _____ **Approved/Tested:** _____

Coarse Aggregate 2: _____ **Approved/Tested:** _____

Fine Aggregate 1: _____ **Approved/Tested:** _____

Fine Aggregate 2: _____ **Approved/Tested:** _____

Batch Water Source: _____ **Approved/Tested:** _____

Admixtures: _____

STEEL COMPONENTS

Reinforcement: Supplier(s): _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Description: _____ **Lab Number:** _____

Inserts: Supplier(s): _____

Description: _____ **Lab Number:** _____

_____

_____

SHIPLOOSE MATERIAL

Grates: Fabricator: _____

Mill Certs.: _____ **Galvanize Cert.:** _____ **Lab Number:** _____

Mastic: Fabricator: _____

Inspected at: _____ **Lab Number:** _____

SHOP DRAWING REVIEW

Approval Date: _____ **Approved By:** _____

PRECAST CONCRETE PRODUCTS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION
SAMPLE FABRICATION CHECKLIST

Preliminary Verifications

POST POUR WORK

Repairs: **Approved Repair Procedures: ____**

Approved by: _____ **Approval Date: _____**

Repair Witnessed: _____

Comments: _____

_____

_____

_____

Sample Form Inspection (Pre-Placement of Concrete)

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Depth of form (ft-inch)				
Inside Width of form (inch)				
Outside Width of form (inch)				
Inside Length of form (inch)				
Outside Length of form (inch)				
Wall Thickness (inch)				
Forms Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product Type(s)		**Form Properly sealed at joints & edges (√)**	
Framework Constructed of metal on concrete foundation (√)		**Form Clean & Free of debris (√)**	
Form dimensionally correct (√)		**Release Agent applied (√)**	
Other Information:			

Reinforcing Steel	
Reinforcing Steel (Condition)	
Fill in steel information (if applicable)	

Size & Grade	
Location & Lapping Length (√)	
Spacing and Clearances (√)	
Chairs, Spacers properly used	

Sample Concrete Placement & Curing

Quality Control Concrete Testing			
Concrete Truck Arrival Time		**Concrete Truck Departure Time**	
Concrete Temp		**Ambient Temp, Weather Conditions**	
Slump/Spread (inch)		**Air Content (%)**	
QC Tests performed per Specifications & Passing		**Number & diameter (inch) of Cylinders**	
Comments:			

Placement of Concrete			
Lift	**Start Time**	**Completion Time**	**Vibrated (External/Internal/Both)**
1st			
2nd			
3rd			
4th			
Placement of Concrete Completion Time			
Comments:			

Curing/Finishing of Concrete	
Top Surface Finished Per Specification	
Lifting loops/inserts accessible	
Product Curing Location (Inside/Outside)	

Product Covered & Heat Applied (Time Start & Time Finished)	
Heat Sensors Installed (√)	
Compressive Strength Cylinders Stored with Product under Curing/Normal Environment (√)	
Compressive Strength Test Conducted when curing was discontinued (√)	
Comments:	

Sample Concrete Post Pour Product Inspection

Product	
Visual Inspection for Damage (√)	
Notes (Size & Location of cracks, spalls, honeycomb, etc.)	
Products in Need of Repair (√)	
Repair Method Approved (√)	
Comments:	

Product Type (s)				
Criteria	**Design Dimension**	**Tolerance (±)**	**Actual Measurement**	**Within Tolerance**
Fill in Form Information (if applicable)				
Height of Product (ft-inch)				
Inside Width of product (inch)				
Outside Width of product (inch)				
Inside Length of product (inch)				

Outside Length of product (inch)				
Wall Thickness (inch)				
Product Square and Level (√)				
Skew dimensions [if applicable (ft-inch)]				
Locations of inserts, sleeves, block outs, etc. (√)				

Product	
Dimensional Tolerances Met? (yes or no)	
Heights (yes or no)	
Widths (yes or no)	
Depths (yes or no)	
Wall Thickness(es) (yes or no)	
Inserts, sleeves, lifting points, etc. (yes or no)	
All Concrete Finishes per specification (yes or no)	
Product properly transported (yes or no)	
Product stored on proper dunnage (yes or no)	
Design Shipping Strength met (yes or no)	
Repairs Satisfactory (yes or no)	
Product Stamped for Final Inspection (yes or no)	
Comments:	

Sample Inspection Sheet

Inspection Date_____ QC Personnel_____ QC Signature_____

Fabricator_____ Location_____

Project Name_____ WV State Project #_____ Federal Project #_____

Authorization # _____ Inspection done by_____

Steel Reinforcement

Reinforcement Supplier _____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Description_____ Approved Lab #_____

Product Description	Quantity	Date Cast	Slump/ Spread (inch)	Air Content (%)	Design Strength (psi)	Cylinder Breaks (psi)	Date Of Break	Absorption (%)
Type "D" inlet								

Type "G" inlet								
36-inch Manhole (base, riser, top)								
48-inch Manhole (base, riser, top)								
10'0"x 12'0" Box Culvert								**NA**
Lagging 8"x24"x54"								**NA**
Type A Reinforced Panel								**NA**
6'0" Coping								**NA**
24-inch Wing wall								

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

INSPECTION AND ACCEPTANCE PROCEDURES FOR PRESTRESSED CONCRETE BRIDGE MEMBERS

1. PURPOSE

1.1 To set forth procedures for the inspection and acceptance of prestressed concrete bridge members, including beams, pier caps, deck panels, and any other prestressed members, and the approval of the plants at which they are fabricated.

2. SCOPE

2.1 This procedure will apply to all prestressed concrete bridge members supplied for use on West Virginia Division of Highways projects and to all prestressed concrete bridge member fabricators that supply material for use on West Virginia Division of Highways projects.

3. REFERENCED DOCUMENTS

3.1 MP 603.02.10 - Guide for Approval of Component Materials at Precast and Prestressed Concrete Plants

3.2 MP 700.00.30 - Certification of Batch Scales and Calibration of Standard 50 Pound Test Weights

4. INSPECTION

4.1 All prestressed concrete bridge member fabricators (hereafter referred to as the Fabricator) shall be approved by Materials Control, Soils and Testing MCS&T Division prior to the start of any work for the WVDOH. If not listed on the WVDOH Approved List of Precast Concrete Fabricators, a Fabricator shall contact MCS&T Division a minimum of six weeks prior to the planned date on which fabrication is to begin.

4.1.1 The process for approving a Fabricator shall include, but not be limited to, an on-site visit to the fabrication plant by a WVDOH representative from MCS&T Division. During this visit, the WVDOH Quality Assurance (QA) personnel shall inspect the fabrication facility and Quality Control (QC) lab, meet with QC and other key personnel

from the Fabricator, and sample component materials which will be used in fabrication of precast items. In addition, all fabricators must set up their invoicing as an E-ticket that meets the requirements of Section 109.20.1 of the Standard Specification prior to approval.

4.1.1.1 Sampling and testing of component materials shall be done in accordance with MP 603.02.10. All component materials shall be approved prior to the start of fabrication. Batch scales shall be calibrated in accordance with MP 700.00.30 at a minimum once per year.

4.1.1.2 Shipping invoices shall document the assigned Laboratory Reference Number, type of material, number of pieces, size, and cast dates. All Division invoicing must be submitted as an E-Ticket to the project that meets the requirements of Section 109.20.1 of the Specifications.

4.1.1.3 Any fabricator which does not produce for the WVDOH for a period of 2 years shall be removed from the approved fabricator list and the fabricator will need to be approved again before they can do work. Sampling of component materials will not continue when the plant is removed from the approved fabricator list.

4.1.1.4 Personnel from the Fabricator required to be present during the initial on-site visit and meeting between WVDOH and Fabricator personnel shall include representatives from Production and Quality Control. Any questions and concerns regarding WVDOH requirements, including applicable Specifications, Materials Procedures, Standard Details, and QC/QA Inspections shall be addressed at this meeting.

4.1.1.5 Prior to beginning fabrication of any prestressed concrete bridge members, the Fabricator shall provide written notification to MCS&T Division at least one calendar week in advance of the date on which fabrication is to begin. After fabrication has begun, the Fabricator shall keep MCS&T Division and the Inspector (whether a WVDOH employee or a contract employee representing the WVDOH) informed in advance of the days on which fabrication will take place.

4.1.2 Shop Drawings must be approved by the West Virginia Division of Highways prior to the start of any work by the Fabricator. The Inspector must have a copy of these approved shop drawings prior to the start of any work by the Fabricator.

4.1.3 The Inspector, as a minimum, shall be registered with the Precast/Prestressed Concrete Institute (PCI) as a Level II Quality Control Technician.

4.2 The Inspector shall be present at any or all times during fabrication including casting bed layout, steel placement, stressing operations, concrete testing, placing, and

finishing, detensioning operations, camber measurements, testing hardened concrete cylinders, post-pour inspections, and repairs.

4.2.1 Fabricators must provide adequate lighting to illuminate the casting bed to allow for visual inspection of the entire rebar assembly and setup. Fabricators must make forms safely accessible for visual inspection of the setup down in the form for the entire length of the bed.

4.3 After fabrication is completed and prior to shipment, the Fabricator shall provide MCS&T Division with a written request for Final Inspection a minimum of one calendar week prior to the desired date of inspection. This written request may be in the form of an e-mail. Upon receipt of the written request for Final Inspection from the Fabricator, MCS&T Division will notify the Fabricator of the earliest possible date of this inspection. Effective communication from the Fabricator to MCS&T Division and Consultant Inspection Agency is key to avoiding any scheduling conflicts regarding Final Inspection.

4.4 At Final Inspection, the Inspector shall witness any compressive strength tests which may be required, inspect repairs as needed, and conduct a thorough visual examination of each member. After the Final Inspection is completed, the Inspector shall provide the Fabricator with a copy of the inspection report. This report shall include the findings of the Final Inspection and any other observations or notes taken by the Inspector during fabrication, including a completed copy of the Inspector's checklist. A copy of the Inspector's daily reports, a copy of the final inspection report, and all other pertinent information provided to the Inspector by the Fabricator shall be kept on file by MCS&T Division.

4.5 The Inspector shall use the checklist and inspection forms which are included as Attachments to this MP. The Fabricator shall also document all required information on the applicable Attachments.

5. ACCEPTANCE

5.1 Upon completion of the inspection of a member, the subject member shall be classified in one of two ways. The first way is that the member does not contain any defects. The second way is that the member contains some type of defect.

5.1.1 If a member meets all specification requirements and does not contain any defects, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2 If a member contains some type of defect, it will be classified into one of the following three categories. These categories are Category I (Cosmetic Defects), Category II (Dimensional Tolerances), and Category III (Structural Defects).

5.2.1 Category I defects include cosmetic defects such as minor spalls with no exposed reinforcing steel or prestressing strand, bug holes, and minor surface irregularities, etc. Category I defects also include cracks up to and including 16 mils in width for which repair procedures are addressed by the standard specifications. Prior to the start of fabrication, the Fabricator shall submit to MCS&T Division, for approval, the proposed repair procedures for Category I defects which may be encountered.

5.2.1.1 Any Category I defect(s) will first be noted by the Inspector and may be subsequently repaired by the Fabricator as per the Fabricator's pre-approved repair procedure. The Inspector shall inspect the repair(s), and if the repair(s) is satisfactory, and if all other aspects of the member meet specifications, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2.2 Category II addresses any aspect of a member which exceeds the dimensional tolerances set forth in the Specifications. The Inspector will document the variance(s) and notify the Fabricator. At this point, the Fabricator may seek acceptance of the subject member by sending a written notification to the Contractor including a copy of the Inspector's report and any other pertinent data.

If the Contractor agrees to accept the subject member with the defect at the original contract price, then the Contractor shall provide a written statement to District Construction personnel and MCS&T Division stating such.

5.2.2.1 The Contractor, or his designated representative (i.e. the Fabricator), shall then contact MCS&T Division and provide them with a report containing all relevant information and a detailed summary of the dimensional variation(s) in the subject member for which the Fabricator is seeking acceptance. MCS&T Division shall then contact the Designer (either Engineering Division, or the appropriate District, or Engineer of Record) and District Construction personnel and forward this information to them. If the member was designed by a Consultant, Engineering Division may forward the information to the appropriate Consultant. The Designer will then analyze the dimensional variation(s) and provide a written statement to the Contractor, the Fabricator, MCS&T Division, and District Construction personnel as to whether it will affect the structural performance of the subject member. After receipt of that statement from the Designer, District Construction personnel shall then provide a written statement to the Contractor, the Fabricator, and MCS&T Division as to whether the dimensional variation will create construction difficulties.

5.2.2.2 If the Designer states that this dimensional variation(s) will adversely affect the structural performance of the member, or if District Construction states that it will create construction difficulties, or if the Contractor does not agree to accept the subject member with the defect at the original contract price, MCS&T Division will not accept the subject member. MCS&T Division will assign a laboratory number to this subject member~~,~~ which notes that the member does not meet specifications, and will include a thorough explanation as to why the member does not meet specification requirements. If rejected by MCS&T, the subject member may be accepted by the District by means of a District Materials Inspection Report (DMIR).

5.2.2.3 If the Designer does not feel qualified to perform the analysis outlined in Section 4.2.2 and make the decision as to whether the dimensional variation will affect the structural performance of the subject member, the Designer shall inform MCS&T Division of this fact, and MCS&T Division will relay this to the Fabricator. The Fabricator may then elect to have the defect(s) evaluated by a Division approved, qualified, independent Engineer in the same manner that the Designer would analyze the defect(s). The Division would then review and take into consideration this Engineer's analysis as part of the acceptance decision.

5.2.3 Category III defects include structural defects (spalls that expose prestressing strand or reinforcing steel, honeycombed areas, etc.) and cracks for which the specifications require evaluation by the Designer. If a member contains any structural defect(s), the defect(s) will be noted in the Inspector's report. The Fabricator shall then provide the Contractor with detailed information regarding the type, size, and location of the defect(s). It is then the Contractor's, or his designated representative's, responsibility to contact MCS&T Division and provide them with a report containing all relevant information and a detailed summary of the structural defect(s) in the subject member for which the Fabricator is seeking acceptance. MCS&T Division shall then contact the Designer (either Engineering Division, or the appropriate District) and forward this information to them. MCS&T Division shall also contact District Construction to inform them of the situation. In situations when the member(s) was designed by a Consultant, Engineering Division may forward the information to the appropriate Consultant. The Designer will then analyze the subject defect(s) and provide a written statement to the Contractor, the Fabricator, District Construction, and to MCS&T Division as to the effect of the defect(s), if the member will be structurally adequate, if a repair may be made, and if, in the Designers opinion, the service life of the member will be reduced because of the defect. It shall also be documented in the Inspector's report whether, in the opinion of the Inspector, the service life of the member will be reduced because of the defect.

5.2.3.1 If the Designer does not feel qualified to make the decision concerning the effect of the defect(s), they shall inform MCS&T Division of this fact, and MCS&T Division will relay this to the Fabricator. The Fabricator may then elect to have the defect(s) evaluated

by a Division approved, qualified, independent Engineer in the same manner that the Designer would analyze the defect(s). The Division would then review and take into consideration this Engineer's analysis as part of the acceptance decision.

5.2.3.2 Category III defect Scenario 1 – Category III defect which will adversely affect the structural performance of the member:

If the Designer states that the defect(s) will adversely affect the structural performance of the subject member, the Division will not accept the subject member.

5.2.3.3 Category III defect Scenario 2 – Category III defect which will not adversely affect the structural performance of the member and will not reduce the service life of the member:

If the Designer states that the defect(s) will not adversely affect the structural performance of the subject member, and that a repair should be made, and if MCS&T Division and the Designer agree that the service life of the member will not be reduced, the Fabricator shall submit a repair procedure to MCS&T Division for approval. If the repair procedure is approved, the Fabricator may proceed with the approved repairs in the presence of the Inspector. If the repair(s) is satisfactory, the Inspector will stamp the subject member as accepted by MCS&T Division.

5.2.3.4 Category III defect Scenario 3 – Category III defect which will not adversely affect the structural performance of the member, but which will reduce the service life of the member:

If the Designer states that the defect(s) will not adversely affect the structural performance of the subject member, and that a repair should be made, but if either MCS&T Division or the Designer feels that the service life of the member will be reduced, the Fabricator may submit a repair procedure to MCS&T Division for approval. If the repair procedure is approved, the Fabricator may proceed with the approved repairs in the presence of the Inspector. After the inspection of the repair(s), the Inspector will document whether the repair(s) is satisfactory. Since the service life of the member will be reduced, MCS&T Division will not accept the subject member. MCS&T Division will assign a laboratory number to this member, which notes that the member does not meet specifications, and will include a thorough explanation as to why the member does not meet specification requirements. MCS&T Division will then contact District Construction, forward all information relevant to the subject member to the District, and based on the quality of the repairs and the degree to which the service life of the member will be reduced, it is the District's option whether or not to accept the subject member. If the District decides to accept the member it will be paid for at a reduced price based on 40% of the Contract Unit Bid Price. . This cost does not include the cost of items such as bearing pads, guardrail items, delivery charges, etc., which are incidental to the cost of the member. If the District accepts

the subject member with this type of defect and reduced service life, it shall be accepted by means of a DMIR.

Michael A. Mance, P.E.
Interim Director
Materials Control, Soils and Testing Division

MM:AT
MP 603.10.40 Steward – Cement and Concrete Section
ATTACHEMENT

ATTACHMENT: PRESTRESSED CONCRETE BRIDGE BEAMS
WVDOT DIVISION OF HIGHWAYS MCS&T DIVISION
INSPECTION CHECKLIST

PROJECT NAME: _____ **AUTHORIZATION:** _____

PROJECT NUMBER: (State) _____ **(Fed.)**_____

BRIDGE NUMBER: _____ **COUNTY:** _____ **DISTRICT:** _____

MANUFACTURER: _____ **JOB NUMBER:** _____

PROPOSED PRODUCTION DATE(S): _____
INSPECTION AGENCY: _____ **INSPECTOR(S):** _____

Preliminary Verifications

SHOP DRAWING REVIEW

Approval Date: _____ **Approved By:** _____

Concrete Strength Requirements: _____ **at release** _____ **at 28 days**

Beam Type: _____ Total Number of Beams: _____

Finish Requirements: Top: _____ **Bottom/Sides:** _____ **Ends:** _____

Notes: _____

_____

_____

CONCRETE COMPONENTS

Cement Source: _____ **Mix Design Lab Number:** _____

Cement Type: _____ **Lab Number:** _____

Coarse Aggregate: _____ **Lab Number:** _____

Fine Aggregate: _____ **Lab Number:** _____

Batch Water Source: _____ **Lab Number (if applicable):** _____

Admixtures: _____

STEEL COMPONENTS

Bearing Plate: **Fabricator:** _____

Mill Certs: _____ **Galvanize Cert.:** _____ **Lab Number:** _____

Reinforcement: Supplier(s): _____

Description: _____ **Lab Number:** _____

_____

_____

Prestressing Strand: Manufacturer: _____ **Description:** _____

Coil Numbers: _____

Lab Numbers: _____

Inserts: **Supplier(s):** _____

Description: _____ **Lab Number:** _____

_____

_____

SHIPLOOSE MATERIAL

Sole Plate: **Fabricator:** _____

Mill Certs.: _____ **Galvanize Cert.:**_____ **Lab Number:** _____

Bearing Pad: **Fabricator:** _____

Inspected at: _____ **Lab Number:** _____

Diaphragm: **Fabricator:** _____

Inspected at: _____ **Lab Number:** _____

Angles: Mill Certs.: _____ **Galvanize Cert.:** _____**Lab Number:** _____

Anchor Rod: **Supplier:** _____ **Description:** _____

Mill Certs.: ____**Galvanize Cert.:** ____ **Lab Number:** _____

Repairs: **Approved Repair Procedure:** _____

Approved by: _____ **Approval Date:** _____

Repair Witnessed: _____

Repair Satisfactory? _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

Form Inspection *(Pre-Placement)*

BEAM NUMBER					
Formwork constructed of metal w/ concrete foundation					
Form clean & free of debris					
Form dimensionally correct					
Length (bulkhead to bulkhead)					
Depth of form					
Width at top flange					
Width at bottom flange					
Width of web					
End square					
Skew dimensions					
Location of inserts, sleeves, blockouts, etc.					
Reinforcing steel (condition)					
Size and grade					
Location & lapping lengths					
Spacing & Clearances					
Chairs, spacers properly used					
Hold Down locations (draped strand)					
Form properly sealed at joints & edges					
Release agent applied					
Strand Placement					
Number of strand					
Strand location (vertical & horizontal)					
Strand free of damage or contaminants					
Strand Tensioning					
Jack & gauge calibration					
Initial load					
Final Load					
Elongation					
Theoretical vs. Actual (within 5%)					
Strand symmetrically loaded					
Check for strand slippage					
Bearing plate location					

Concrete Placement

Ambient temperature, weather conditions					
Concrete Temperature					
Concrete quality (appearance)					
Placement (start/completion times)					
1st Lift					
2nd Lift					
3rd Lift					
QC Tests performed per specification					
Slump					
Air content					
Compressive strength cylinders					
Concrete placed within specified time restrictions					
Concrete properly vibrated					
External vibration applied					
Internal vibration per specification					
Top surface per specification					
Lifting loops per specification					
Curing per specification					
Heat sensors properly installed					
Beams adequately covered					
Compressive strength cylinders stored with beams					
Stress Transfer					
Cylinders loaded to failure per specification					
Release strength met – record average of 2 tests (psi)					
Strands properly cut					
Strands detensioned in specified sequence					

Product Inspection *(Post-Placement)*

Visual inspection for damage					
Note size & location of cracks, spalls, honeycomb, etc.					
Discuss damaged areas with QC Manager					
Beams in need of repair					
Repair method approved?					
Dimensional Tolerances met?					
Length					
Width(s)					
Depth					
Inserts, sleeves, etc.					
Stirrups (horizontal. & vertical within tolerance)					
Finish per specification					
Top scored per specification					
Fascia finish as specified					
Camber					
Lifting loops OK					
Beams properly transported					
Beams stored on proper dunnage at bearing points					
Sweep					
Design shipping strength (28 day) met? (avg of 2 tests)					
Repairs satisfactory					
Beam stamped for shipment					
Concrete Sealer (Silane) applied as specified					
Interior Sides blast cleaned (within 5 days of shipment)					

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE 720.10.01

GUIDE FOR USING A HIGH-SPEED INERTIAL PROFILER TO MEASURE THE LONGITUDINAL PROFILE OF PAVEMENT

1. SCOPE

1.1. This procedure establishes a process for collecting longitudinal profiles of roadways using a High Speed Inertial Profiler (HSIP) equipped with laser height sensors. The HSIP shall be capable of collecting data at speeds between 15 mph and 65 mph. The collected data is analyzed to determine rate of smoothness or Ride Quality.

1.2. The rate of smoothness of the pavement is measured using the International Roughness Index (IRI) with units of inches per mile (in/mi).

2. PURPOSE

2.1. To establish a procedure for safe operation of a HSIP and the collection of quality pavement longitudinal profile data.

3. REFERENCED DOCUMENTS

3.1. AASHTO R-56: Certification of Inertial Profiler System

3.2. AASHTO R-57: Operating Inertial Profiler System

3.3. AASHTO M-328: Standard Specification for Inertial Profiling

3.4. ASTM E-950: Standard Test Method for Measuring the Longitudinal Profile of Traveled Surfaces with a Accelerometer-Established Inertial Profiling Reference

4. EQUIPMENT REQUIREMENTS

4.1. The High-Speed Inertial Profiler (HSIP) must conform to AASHTO M-328 and have a minimum of two laser sensors and two accelerometers mounted in tandem with each wheel path laser. The lasers shall be mounted between 30 and 36 inches to the left and right of the center of the host vehicle. Other equipment can be added including, but not limited to, a third laser mounted on the center line of the host vehicle for rut evaluation. The HSIP shall be equipped with a data acquisition system that collects and stores elevation profile data and a Distance Measuring Instrument (DMI) for measuring traveled distance. The HSIP may also incorporate a Global Positioning System (GPS) unit. The host vehicle shall not exceed the axle loads specified by the vehicle manufacturer.

4.2. The HSIP shall be equipped with an automated triggering system capable of detecting a reference mark to start, stop, and event mark the data collection process.

4.3. All measuring requirements shall comply with AASHTO R 56. The resolution of the vertical measurement shall be a minimum of 0.001 inches. The accelerometer range shall be large enough to accommodate the levels expected from the bounce motions of the measuring vehicle. The DMI shall produce a sufficient series of pulses, the intervals which represent a distance along the traveled surface that would result in a resolution of less than or equal to 1.0 inch. The data acquisition system shall also operate at a sufficient speed and capacity in order to display the sensors' outputs in real time.

4.4. All electronic and mechanical components of the profiling system shall be adequately designed and built to meet or exceed the requirements set forth in AASHTO M 328.

5. SAFETY~~SAFTEY~~ PRECAUTIONS~~PERCAUTIONS~~

5.1. The HSIP, all attachments, and host vehicle shall comply with all applicable State and Federal Laws. Additional precautions shall be taken beyond those imposed by law to ensure the safety of all personnel and the general public. At minimum the following conditions must be followed when testing with a HSIP:

1. All test lanes must be free of any debris and obstructions.
2. Heavy acceleration and deceleration should be avoided while testing.
3. All lanes must remain open to traffic unless deemed unsafe.
4. Testing should not be done during peak~~during done peak~~ traffic hours.
5. Testing should only be conducted at speeds recommended by the manufacturer~~manufacture~~.

6. CALIBRATION~~CALBRATION~~ AND VERIFICATION~~VERIFCATION~~

6.1. Calibration Locations

6.1.1. Distance Calibration Test Location – The test section(s) used to calibrate the distance measuring instrument (DMI) shall be tangent and require a minimum length of 528 feet with minimal grade. The test section should have little to no traffic with areas for the HSIP to turn around on either end. The test section shall include a minimum of 528 feet lead in and lead out sections as well as at least 528 feet for the calibration testing and verification. The pavement shall be free of standing water and debris during testing and calibration. The length of the test section shall be measured using a measuring wheel capable of measuring distances to the nearest 1.0 inch accuracy. The triggering mechanism (i.e. reflective tape) shall be placed at the beginning and end of the test section to signal the location of section limits.

6.1.2. Pre~~er~~ Operation Calibration and Verification – Pre-operation calibration and verification should be done on a flat and smooth surface while there is little wind. Pre-operation calibrations and verification includes:

1. Tire Pressure Check (Section 6.2.1)
2. Block Test (Section 6.2.3)
3. Accelerometer Calibration (Section 6.2.4)
4. Bounce Test (Section 6.2.5)

6.2. Calibration and Verification Procedures

6.2.1. Tire Pressure Check – The cold tire pressure shall be checked and maintained as set by the inertial profiler Manufacture. The check shall be performed before warm-up and according to Table 6.3.

6.2.2. Distance Check and Calibration – After checking the cold tire pressure and before calibrating the DMI, the tires and electronic equipment shall have enough time to warm-up as specified by the manufacturer~~manufacture~~. The operator shall measure the longitudinal distance traveled using the DMI on the HSIP on a test section measuring at least 528 feet with an accuracy of ±0.15 percent. If the measured distance is out of tolerance, (for a 528 feet test section the acceptable limits are ± .792 feet) the DMI must be recalibrated. The calibration passes shall be done at a constant speed above 15 mph by traveling the test section in three repeat passes or as recommended by the manufacturer~~manufacture~~. All passes should be done in the same direction as the section was measured. The passes must be auto triggered at the beginning and end of the test section. If the operator deems any pass questionable, such pass shall be discarded and the distance measurement repeated until sufficient number of runs with consistent accuracy is achieved. This calibration data and distance calibration factor shall be saved and used for distance data collection.

6.2.3. Block Test – Before completing the block test the accelerometer calibration shall be done while no one is inside the HSIP. The block test shall be performed according to manufacturer's procedures while meeting or exceeding the requirements outlined~~outline~~ in AASHTO R 57. Using a minimum of three-gauge blocks that measure at three different heights. The thickness of each gauge block shall be measured at three different positions on each side of the block with a device capable of measuring to the nearest 0.001 inch. For each block, nominal thickness shall be determined as an average of the measurements made and recorded. The average distance between nominal thickness of the block and measured values for each block shall not exceed 0.01 inch. The equipment shall have the capability to display and report the error for the operator's acceptance. In the absence of manufacturer's~~manufacture's~~ procedures, the block check shall be performed as specified in AASHTO R 57.

6.2.4. Accelerometer Calibration – Prior to the accelerometer calibration, the HSIP shall be warmed-up as specified by the manufacturer~~manufacture~~ Must be done according to manufacturer's procedures with operator and other personnel present for daily data collection seated in the HSIP.

6.2.5. Bounce Test – Prior to the Bounce test, the HSIP shall be warmed-up as specified by the manufacturer~~manufacture~~. In addition, the accelerometer calibration shall be completed while no-one is inside the HSIP and the vehicle's motor is turned off. The bounce test shall be performed by positioning the HSIP on a level and flat surface with no wind present. The HSIP's engine must be turned off with the emergency brake applied and with the transmission in park. In some cases, it may also be necessary to place tire chalks on either side of the front tires and a thin non-glossy surface, such as a sheet of paper placed under both wheel path lasers. The data shall be collected by simulating the DMI at the manufacturer's~~manufactures~~ recommended speed. At

minimum, data collection shall be performed with a 0.1 mile of lead-in, a 0.1 mile static portion of the test, a 0.5 mile bounce portion, followed by another 0.1 of static collection. During the bounce portion, the laser sensors shall be vertically displaced in a smooth motion for a total displacement between 1 and 2 inches. The bounce test shall be analyzed using the IRI interval report with a segment length of 528 feet. The static portion of the test shall be less than 3 inches/mile and the bounce portion IRI results shall be less than 8 inches/mile. If the system fails to meet these requirements repeat this procedure three additional times. If thresholds cannot be achieved in all three interactions, contact the manufacturer~~manufacture~~ for troubleshooting before additional testing is performed. The bounce test shall be done according to the schedule outlined in Table 6.3 After the bounce test is successfully completed and recorded, accelerometer calibrations shall be redone with operator and other personnel present for daily data collection seated inside the HSIP and done according to Section 6.2.4.

6.3. Frequency of Calibration and Test Procedures ~~.~~ The frequency of calibration procedures described in Section 6.2 shall be performed in accordance with Table 6.3 at minimum.

Table 6.3- Frequency of Calibration Procedures

Calibration Procedure	**Frequency**		
	Before Every Project	Daily	Weekly
Tire Pressure and Safety Lights (Section 6.2.1.2)		x	
Distance Calibration/Check (Section 6.2.1)			x
Accelerometer Calibration (Section 6.2.2)	x		
Block Test (Section 6.2.3)			x

7. OPERATOR AND EQUIPMENT CERTIFICATION~~CERTFICATION~~

7.1. All HSIP operators must be certified by the West Virginia Division of Highways. To obtain certification or recertification, contact the WVDOH Quality Assurance Training Program Administrator at qaschoolscoordinator@wv.gov. Proof of certification must be available upon request.

7.2. The equipment must be certified at a facility approved by the Materials Control, Soils and Testing Division. Proof of certification must be available upon request. For more information contact the Pavement Analysis and Evaluation Section at DOHMCSnTRoadway@wv.gov~~WVDOH State Pavement Engineer~~.

8. DATA COLLECTION

8.1. Bring the HSIP to the desired speed and alignment prior to the section being tested. Speed should be maintained as constant as possible throughout the test.

8.2. Turn the Distance Measurement Instrument (DMI) on approximately 500 feet before the start of the test section.

8.3. At the beginning milepost of the project, reset the DMI and begin data collection.

8.4. After marking the end of the project, continue~~project continue~~ driving the lane that is being tested for a minimum of an additional 200 feet after the ending milepost and then turn the DMI off.

8.5. Do not test pavement if debris or standing water is present.

8.6. Perform testing per manufacturer's operating procedures.

8.7. It is recommended that areas that will be removed from analysis (bridges, intersections, etc.) be flagged and noted.

8.8. Areas where the HSIP is operated below the manufacturer's recommended operating speed shall be flagged and noted.

8.9. Raw data, equipment maintenance, and calibrations records shall be maintained in a log book located within the host vehicle or on the data collection system and made available upon request.

8.10. The data shall be collected and exported with the 250-mm filter turned off.

9. ANALYSIS

9.1. All analysis shall be completed using the most recent version of ProVAL.

9.2. All applicable runs for the project shall be imported to one ProVAL file and renamed to reflect lane and direction (i.e: EB Traffic Lane)

9.2.1. The name of the project must be the Contract ID for the project followed by "RQ Analysis".

9.3. Unless otherwise noted, analysis should be done using Ride Quality analysis in a fixed interval length of 0.1 miles. Analysis shall be done for both the right and left wheel-paths as well as the average IRI of both wheel paths or Mean Roughness Index (MRI).

9.3.1. The 250mm filter shall be checked when running analysis.

9.4. The lead in/out sections, areas where the HSIP is operated below the manufacturer's suggested speed, as well the areas that are not part of the project shall be removed from analysis. The data shall be analyzed in accordance with WVDOH Specification 720.4 unless otherwise noted.

10. REPORTING AND SUBMITTING

10.1. All Ride Quality data for a particular project shall be submitted to the project engineer with the following information:

1. One ProVAL project with all data analyzed
2. Excel and .pdf Reports created from ProVAL
3. The WVDOH Road Profile Log Sheet completed for each project. Please see the WVDOH MCS&T Webpage Toolbox for the most current version of the fillable form for the WVDOH Road Profile Log Sheet (non-fillable sample form is attached.)

Commented [DB1]: Add link to webpage in document

10.2. All raw data does not need to be submitted, however shall be available upon request.

_____
Michael A. Mance, P.E.
Director
Materials Control, Soils and Testing Division

ATTACHMENT

MM:Awf

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

METHOD FOR APPROVING DEVICES USED FOR TESTING DENSITY AND/OR MOISTURE CONTENT OF IN-PLACE MATERIAL

1. PURPOSE

1.1 To establish procedures used to approve the use of testing devices for Density and/or Moisture of in-place material on WVDOH projects.

2. SCOPE

2.1 To establish procedures used to approve the use of testing devices for Density and/or Moisture of in-place material on WVDOH projects.

3. REFERENCED DOCUMENTS

3.1 ASTM D8167/D8167M

3.2 MP 207.07.20 – Nuclear Field Density – Moisture Test for Random Material Having less than 40% of +3/4 Inch Material

3.3 MP 700.00.24 – Nuclear Density Test by Roller Pass Methods Revised December 2008

3.4 ASTM D4959 – Standard Test Method for Determination of Water Content of Soil by Direct Heating

3.5 ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

4. TESTING PROCEDURE

4.1 Testing devices must meet WV DOH Standard Specification 717.3.2, as well as conform to the needs of the above referenced MPs

5. APPROVED LIST OF DEVICES FOR TESTING OF DENSITY AND/OR MOISTURE OF IN-PLACE MATERIAL

Process TBD

6. APPROVAL OF DEVICES FOR TESTING OF DENSITY AND/OR MOISTURE OF IN-PLACE MATERIAL

7. Process TBD

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

PROCEDURE FOR EVALUATING QUALITY CONTROL SAMPLE TEST RESULTS WITH VERIFICATION SAMPLE TEST RESULTS

1. PURPOSE

1.1. To provide a procedure for the comparison of quality control sample test results with verification sample test results. ~~(similarity).~~

Commented [DB1]: All instances of "similarity" replaced with Verification

2. DEFINITIONS

2.1. Quality Assurance: Samples performed by the Division to accept material on the Project

2.2. Quality Control: Samples performed by the Contractor on the Project to demonstrate material compliance.

2.3. Verification Sample: A quality assurance sample performed by the District and Statistically compared to a series of Quality Control Samples

3. SCOPE

3.1. This procedure is used to review and evaluate contract quality control samples.

3.2. Materials and Tests

3.2.1. Aggregate Gradations

3.2.2. Asphalt (Marshall)

1. Asphalt Content
2. Air Voids
3. Stability
4. Flow
5. Gradation

3.2.3. Asphalt (SuperPave)

1. Asphalt Content
2. Air Voids
3. Gradation

3.2.4. Portland Cement Concrete

1. Air Content
2. Consistency

4. PROCEDURE

4.1. The following procedure will be ~~implemented~~ performed by the District Materials Supervisor.

4.2. After completion of the verification sample test, the data will be entered into the Division approved materials tracking program. This data will be compared by the software to the applicable quality control sample test results for the same item. Note that all samples being compared must be taken from the same sampling location, e.g., stockpile, roadway, etc., and sampled and tested in the same manner.

4.2.1. If there are more than ten quality control samples, a verification sample shall be done for the first ten samples. Additional verification samples shall be done at the frequency of one in ten.

4.2.1.1. For example, if 16 QC samples are taken, there shall be a verification for samples 1-10 and then another for 11-16.

Commented [DB2]: Moved to its own section

4.2.1.2. If there are only five to nine quality control samples available, determine the average of all the available consecutive quality control test results. When comparing the grading characteristics of an aggregate, the average ($\bar{X}$) for each sieve will be determined.

4.2.2. In the event there are less than five quality control samples available when the verification sample is complete, the District Materials Supervisor will ~~make an informal~~ review ~~of~~ the data. If the data is such that a dissimilarity appears obvious ~~(even without a formal comparison)~~ then Section ~~4~~5.1 of this procedure would apply. If, however, the verification sample results appear to be similar to the quality control sample results then the verification sample would be judged at this point by the District Materials Supervisor to be similar, and the applicable portions of Section ~~5~~6.1 of this procedure would apply with the following statement: "This verification sample (verification sample number recorded here) has been judged to be similar in accordance with Section ~~3~~4.2.2 of MP 700.00.54." This statement shall be on the sample record.

4.2.3. Determine the range (R) of the quality control samples used in Section ~~3~~4.2.1 by subtracting the smallest test value from the largest test value. When comparing the grading characteristics of aggregate, the range (R) for each sieve will be determined.

4.2.4. Compute the interval (I) by substituting the values calculated in Sections ~~3~~4.2.1 and Section ~~3~~4.2.3 into the proper equation below. When comparing the grading characteristics of aggregate, the interval(I) for each sieve will be determined.

No. of Samples Used in Calculating the Average in Section ~~3~~4.2.1	Equation for Computing the Interval (I)
10	$I = \bar{X}_{10} \pm 0.91 \times R$
9	$I = \bar{X}_{9} \pm 0.97 \times R$
8	$I = \bar{X}_{8} \pm 1.05 \times R$
7	$I = \bar{X}_{7} \pm 1.17 \times R$
6	$I = \bar{X}_{6} \pm 1.33 \times R$
5	$I = \bar{X}_{5} \pm 1.61 \times R$

4.2.5. The interval (I) is determined by first adding the average ($\bar{X}_n$) to the product of the range (R) times the given constant. This determines the upper limit of the interval. ~~Note that for gradings, i~~If the result obtained is greater than 100, it will be recorded as 100. ~~And s~~Next~~econd~~, subtract the product of the range (R) times the given constant from the average ($\bar{X}_n$). This determines the lower limit of the interval. ~~Note here that i~~If the result is less than zero, it will be recorded as zero.

4.2.6. Compare the verification sample test result with the calculated interval. When comparing the grading characteristics of aggregates, a comparison for each sieve will be determined.

Aggregate Verification Samples.

4.3. The verification sample will be considered similar if ~~If the verification sample is an aggregate and~~ all sieve results ~~coincide with or~~ fall within the~~lie between the~~ upper (U^l) and lower limits (L^l) of the interval~~, the quality control sample test results will be considered similar to the verification sample test results.~~ ($U^l <= Result <= L^l$). Otherwise, the sample will be considered dissimilar.

Asphalt Verification Samples.

4.4. The verification sample will be considered similar if the asphalt content and air voids fall within the upper (U^l) and lower limits (L^l) of the interval ($U^l <= Result <= L^l$). Otherwise, the sample will be considered dissimilar.

Portland Cement Concrete Verification Samples

~~If the verification sample is an aggregate and any one of the compared values (on any sieve) does not coincide with or lie between the upper and lower limits of the interval, the quality control samples test results will be considered dissimilar to the verification sample.~~

~~If the verification sample is an asphalt mix, and the asphalt content and air voids coincide with or lie between the upper and lower limits of their interval, the quality control samples will be considered to be similar to the verification sample.~~

~~If the verification sample is an asphalt mix, and any one of the compared values is not similar to the quality control data, the quality control samples will be considered to be dissimilar.~~

4.5. The verification sample will be considered similar if the air content and consistency fall within the upper (U^l) and lower limits (L^l) of the interval ($U^l <= Result <= L^l$). Otherwise, the sample will be considered dissimilar.

~~4.3. If the verification sample is Portland Cement Concrete, and both the air content and consistency coincide with or lie between the upper and lower limits of their interval, the quality control samples (tests) will be considered similar.~~

5. EVALUATION

5.1. If the quality control sample data is dissimilar to the verification sample ~~the following~~the District Materials Supervisor ~~action~~ will ~~be~~ take~~n~~ the following actions where appropriate:~~.~~

~~5.1.1.~~1. Review the quality control sampling procedure.

~~5.1.2.~~2. Review the quality control testing procedures.
~~5.1.3.~~3. Check testing equipment.
~~5.1.4.~~4. Review computations.
~~5.1.5.~~5. Review documentation.
~~5.1.6.~~6. Perform any additional investigations that may clarify the dissimilarity.

6. REPORTING AND SAMPLE SUBMISSION

6.1. If the quality control samples are found to be similar to the verification sample, the sample shall be ~~marked~~ labeled ~~as~~ "Similar~~-~~ Passed" and submitted to the respective Materials Regional Coordinator for final evaluation using the currently materials tracking software.

6.2. If the quality control samples are dissimilar ~~to the verification sample~~, the sample shall be ~~marked as~~labeled "Non-Similar" and submitted to the respective Materials Regional Coordinator for final evaluation using the currently materials tracking software.

6.2.1. If the Sample is not non-similar, a note ~~will~~ shall be made on the sample record including a brief statement of the action taken to correct the deficiency.

~~6.2.1.~~6.2.2. In the event that other documentation is needed to resolve the material, ~~, such as a District Materials Inspection Report, to explain and/or support the final resolution of the dissimilarity, the dissimilar verification sample number should be referenced~~that information shall also be provided ~~therein~~.

6.3. The results of the investigation as reported will be noted by District Materials in their email submission.

6.4. The test agency view shall contain the information: "Issued by District (Number) per MP 700.00.54, (Date)."

6.5. When the sample is completed, it shall be authorized by the respective Materials Regional Coordinator.

6.6. The testing technician shall be listed on each sample.

Michael Mance, PE
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Materials Control, Soils & Testing Division

MP 700.00.54 Steward – Materials Control Section
MM:B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

POLICY FOR MATERIALS CERTIFICATION RECIPROCITY

1. PURPOSE

1.1 This Materials Procedure is for certifying applicants who do not hold current materials certifications from West Virginia. Details for the Technician program can be found in MP 106.03.50 on the Materials Division Website[1].

1.2 This Materials Procedure establishes a path for those applicants who wish to become certified PCC Inspectors, PCC Technicians, and/or Aggregate Technicians in the state of West Virginia. For those who currently hold certifications in surrounding states or recognized industrial certifications the Provisional Path is available. This path is available only if the West Virginia Division of Highways deems the certification(s) transferable into the West Virginia certification program.

2. PROVISIONAL PATH

2.1 This certification path is for applicants who hold a current, applicable certification from another state, or recognized industrial certification and wish to become a certified West Virginia Inspector/Technician. To become certified through this path, the applicant must take the West Virginia provisional certification exam. The applicant will be given only one (1) attempt to test-out and receive a passing score. The applicant may only test-out for disciplines that the West Virginia Division of Highways deems as a comparable certification.

2.2 If a passing score is not obtained on the test-out, the Provisional Certification will not be provided, and applicant will be required to take the respective class and pass the certification exams to be certified in West Virginia. If a passing score is obtained the applicant will become a West Virginia certified inspector and be bound by the rules of the West Virginia Certification Program.

2.3 To request a Provisional Certification, the following steps are required:

2.3.1 The applicant must provide copies of all current, applicable certification cards / certificates.

[1] https://transportation.wv.gov/highways/mcst/Pages/MP-100s.aspx

2.3.2 Email these attachment(s) to qaschoolscoordinator@wv.gov

2.3.3 The West Virginia Division of Highways will review the application and will notify the applicant within 30 days by email if the application has been approved or rejected. The applicant shall then be required to create an online learning account. (See Section 3.)

3. CREATING AN ACCOUNT AND SCHEDULING THE EXAM

3.1 To create an online learning account, visit the How to create an online learning account[2] webpage at the Materials Control, Soils and Testing Division website and follow the instructions. The applicant shall notify qaschoolscoordinator@wv.gov by email that the account has been established.

3.2 After passing the exam, the Provisional Applicant may go to The technician certification search portal[3] at the Materials Control, Soils and Testing Division website and print out the Provisional Certification Card. The card may also be saved as a screenshot on a smart phone, which may be used in-lieu of a printed card.

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Ronald L. Stanevich, P.E.
Director
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MP 106.03.51 Steward – Personnel, Payroll Section
RLS:Eb

[2] https://transportation.wv.gov/highways/mcst/Documents/Technician School Documents/Coursemill new account instructions.pdf
[3] https://transportation.wv.gov/highways/mcst/Pages/Technician-Directory-Portal.aspx