2019 Internal Quality Assurance Materials Audit Update

Focus on Quality
Definition:

1) All those planned and systematic actions necessary to provide confidence that a product or facility will perform satisfactorily in service

2) Making sure the quality of a product is what it should be
Regulatory requirement, but why is materials testing important?

- Assures that materials meet specifications
- Approximately 70% of the construction dollar is spent for PURCHASE of materials
- Reduces risk of fraud - Protects public interest
Quality Acceptance Program Regulated by 23 CFR

Requirements for WisDOT to Use Contractor QC Data for Acceptance

- Sample & Testing Frequency Schedules Required
- Sample & Testing Random Sample Locations Required
- Sample & Testing Conducted by QC & QV
  - Material Attributes To Be Tested/Inspected to Determine Compliance
- Materials Acceptance & Payment Based on Verification(QV) of the Contractors QC Data
Why QV Data Validation is necessary?

- Data validation is required if the owner agency would like to **supplement** their QV acceptance testing with the contractor’s process control sample and testing data.
Each fiscal year BTS conducts a review of materials records from approximately 15 randomly selected construction projects to ensure materials sampling, testing, and documentation requirements are being met.
Scope of WisDOT QA Internal Audits

- All records should contain sufficient detail to sustain an audit and should be clear enough to be read and understood by persons not associated with the project.

- MTS and HQMS website are used to review test records.

- Important audit elements: qualified laboratories; certified samplers and testers; aggregate quality and source identification; QC & QV sampling and testing performed; random numbers documented; etc.
The following information is required by the Legislative Audit Bureau (LAB) for the Quality Assurance review:

- Description, item number, quantity and units for the material
- Acceptance basis (non QMP/mill certification/testing requirements)
- Materials certifications
- Verify Random Sample procedure along with testing frequency
- Number QV Tests Required
- Number QV Tests Performed
- Testers names, dates, and required HTCP certification to complete the test (for Verification Testing)
- Verify the number of QC test required and performed
- Verify if testing was documented correctly?
- Any remarks on a test found to be missing or the reason for exception (such as small quantity)
- Copies of original QV/QC project QMP documentation
Source Documentation

CMM Section 8-30 - QMP General:

Source Documentation Is:
- Test data entered directly into electronic document or original handwritten test data.

Project Record Submission:
- Records shall include the original source (electronic or handwritten) documents.
- A scanned copy of original source document is acceptable.
Some random numbers were not generated because no QV testing was conducted.

Some random numbers were generated and written down, but computer generated sheets were discarded after sampling.

Missing random numbers on a few ancillary concrete tests.
Internal QA Audit Findings - Missing QC Tests

Bid Item Name: 614.0396 - GUARDRAIL MOW STRIP ASPHALT  
Qty: 279.42 SQUARE YARDS  
Spec Reqmnt: Submit design mix along with strength test results to the engineer at least 10 business days before placing material.

Disposition Explanation: The contractor’s low-strength backfill supplier was not able to provide strength test results in advance, so the contractor requested that the project staff approve the low-strength backfill based on the mix design. The construction staff reviewed the mix design and approved the mix without test results.

Bid Item Name: Base Aggregate Dense 1 1/4 - Inch  
Qty: 434 TON(S)  
Spec Reqmnt: Special provision for QMP Base Aggregate section A.2.2 requires the contractor submit 1 stockpile test prior to placement and 2 production or 1 loadout test.

Disposition Explanation: Contractor submitted one stockpile test prior to placement as well as two production tests, however the production tests were out of date. According to the special provisions for QMP Base Aggregate production test results are valid for a period of 3 years; the production tests submitted were taken in 11/2013 which is over 3 years old. The material was allowed to stay in place with no pay reduction based on the satisfactory stockpile test taken prior to placement of the material and due to the fact that the out of date test results were satisfactory.
Bid Item Name: Concrete Masonry Bridges

Spec Reqmnt: Handpour Concrete: 6 +/- 1.5 (4.5-7.5)

Qty: 9 CUBIC YARDS

Disposition Explanation: QC random test indicated high air at 7.7%. Contractor elected to place material and made cylinders in accordance with Section 8-10.6.1.2 of the current WisDOT CMM, which states to evaluate strength data for high air. 28 day cylinders were cast and broke at the following PSI: 4572, 4742. No price reductions will be applied as strengths met the acceptable PSI in accordance with Section 8-10.6.1.2 of the current WisDOT CMM.
Internal QA Audit Findings -
Missing QV Tests

Bid Item Name: 208.1100
Spec Reqmt: The placed quantity of 25,180 CY would indicate that 9 QV tests should have been obtained for a frequency of 1 per 3000 CY

Disposition Explanation: The 9th QV test for select borrow was not obtained because it was not needed. The select borrow quantity was being tracked by load counts as it was being hauled out of the pit, and that quantity never reached the 9th random number QV test location because the remaining quantity to get to the placed quantity of 25,180 CY came from the on-site common excavation material from the bridge structure excavation, which is not select borrow material that would have been included in the QV random # testing frequency for select borrow.

Bid Item Name: 460.1110 - HMA PAVEMENT E-10 (12.5mm)
Spec Reqmt: 1 test per 5,000 tons of material placed per mix design.

Disposition Explanation: The random number was never reached for to trigger the QV testing, so no test was taken. 1 test per 5,000 tons per mix is required, and only 255 tons of this mix were placed on the project. Because the random number for QV testing was never reached at only 255 tons of material placed, no QV sample was taken.
Internal QA Audit Findings - Missing QV Tests (cont.)

Bid Item Name: 390.0303 - BASE PATCHING CONCRETE
Spec Reqmt : Perform QC/QV

Disposition Explanation: While milling off the asphalt overlay, the underlying concrete pavement was discovered to be broken up and in need of repair. The repair had to be performed quickly because the paving was scheduled for the following day, in order for the project to remain on schedule. The contractor agreed to perform the repair work on short notice, however, some of the QC/QV requirements were relaxed by the project staff to accommodate the last minute nature of the work. No QV testing was performed; however, the QC testing was inspected and verified by project staff, so the material was accepted. Also, a grade E mix design was permitted because part of the base patch extended into a concrete approach slab on an adjacent bridge not under repair. Finally, no cylinders were made for this base patch (mix design.

Bid Item Name: Concrete Approach Slab
Spec Reqmt : One random QV test

Disposition Explanation: One QV test was missed for the approach slab concrete ( WI 585). Total concrete placed was 54 CY.

Bid Item Name: Concrete Curb & Gutter
Spec Reqmt : New mix design requires a QV test

Disposition Explanation: One QV test is required on a new mix design (Mix# 926)
Internal QA Audit Findings - Missing QV Tests (cont.)

Bid Item Name: Concrete Curb & Gutter
Spec Reqmnt: One QV test for a new mix design

Disposition Explanation: One QV test is required for a new mix design (Mix #928).

Bid Item Name: Concrete Curb and Gutter 6-inch Slopped 36-inch Type D
Spec Reqmnt: Air: 7%, +/- 1.5% (5.5 - 8.5) (slipform)
Slump: 2.5 inches or less (slipform)

Disposition Explanation: No QV test performed due to small quantity of concrete and not testing the same loads of material as QC. Material accepted based on satisfactory QC test results.
Internal QA Audit Findings - Engineer Directed Testing

Bid Item Name: 602.0405 - Concrete Sidewalk 4-Inch
Spec Reqmt: Non slip-formed concrete contains 6 percent air +/- 1.5 percent.

Disposition Explanation: Engineer directed contractor to take air test after failing result on QV random air test. Contractors air test also failed. Contractor took high air compressive strength cylinders. Contractor took process control test on next load of concrete. Air entrainment was back within the required specification at 7.4%. Material accepted based on satisfactory compressive strength results from high air cylinders.

Bid Item Name: Concrete Masonry Bridges
Spec Reqmt: Handpour Concrete: 6 +/- 1.5 (4.5-7.5)

Disposition Explanation: QC random test indicated high air at 7.7%. Contractor elected to place material and made cylinders in accordance with Section 8-10.6.1.2 of the current WisDOT CMM, which states to evaluate strength data for high air. 28 day cylinders were cast and broke at the following PSI: 4572, 4742. No price reductions will be applied as strengths met the acceptable PSI in accordance with Section 8-10.6.1.2 of the current WisDOT CMM.
Internal QA Audit Questions?
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