

Materials & Tests Unit



Standard Operating Procedure Inspection of Aggregates

Objectives:

The purpose of this SOP is to establish guidelines for the inspection, the acceptance and the reporting of Aggregate Samples. The SOP is designed to insure all inspectors/technicians follow the same procedures and comply with all NCDOT, ASTM and AASHTO specifications. The inspectors/technicians will insure quality control techniques, quality control records, and testing equipment are being followed.

Materials Inspection and Acceptance:

It is mandatory for technicians/inspectors to follow the process of this SOP in order to establish, manage, and monitor quality control, quality assurance and quality documentation. Following the proper inspection process will ensure effectiveness and efficiency in the quality systems of the NCDOT.

1. Periodically review this aggregate SOP.
2. Weekly review the Aggregate Quality Control/Quality Assurance Program booklet to ensure proper procedure is used in sampling and inspecting the producer facilities. Check with the Section Materials Specialist to see if any revisions have been made to the program.
3. Check testing equipment and supplies and check safety equipment to ensure expiration date has not passed.
4. Check email and HiCams for notifications of test results of samples taken on last visit. If producer has emailed test results to inspector, view the results to see if any problems (failing samples, or in some cases no failing samples).
5. Once on site at the producer facility, check in at the office as required by our policy. While we have the responsibility of monitoring stockpiles for adherence to the Aggregate Quality Control/Quality Assurance Program, safety comes first. The primary reason to check in the office is to adhere to safety policies.

DO NOT ACCEPT ANY MATERIALS ALREADY AT THE LAB

- Sample ALL Department Specification Size Material
- Sample Weight Requirements*
 - Coarse Aggregate: 20 pounds
 - Fine Aggregate: 10 pounds
 - ABC: 35 pounds
 - *Double weights when Sampling QA Split

Sampling Should be Conducted Randomly Every Two Weeks

- Verification Samples (10,000 tons)
Taken Independent of QC Sample
QC may take sample
- QA Split Sample (formerly QA) (20,000 tons)
 - QC Portion Qualified in QAP
 - One Sample Taken in Quarry Lab and Split for QC/QA Comparison
 - Weigh the bags for 3% (\pm 2.1 pounds) Different compliance (esp for ABC)

Non-Compliance Samples

Verification Sample Investigation Caused When:

- Non-Comparing Mean for 2 Sieves on Clean Stone
- Non-Comparing Mean for 3 Sieves on ABC (not Including Soil Mortar) or Fine Aggregate
- Statistical Analysis will be conducted by the QA Engineer

Caused When:

- If individual Samples Out of Spec, Document and Inform SMS and QA Engineer
- Document Outcome and Share Results with Quarry and QA Engineer.
- Samples do not fall within the allowable limits of program manual.
- Review test procedures and equipment to determine the discrepancy.
- Document the outcome and share results with Quarry and QA Engineer.

Safety Equipment List:

Safety Shoes with ANSI Z 41 rating
Hard Hat with ANSI Z89.1 rating and current year
Safety Glasses
Gloves
Bright orange safety vest with yellow reflective stripes
Ear Plugs
Lifting Belt (optional)

Safety Concerns:

- Aggregate stockpile face aspect ratio must remain in safe condition. This is a situational awareness issue. The Materials Inspector should not attempt to sample material from a stockpile if the load face is in danger of collapsing.
- Situational awareness again applies to equipment moving on producer's yard. Moving equipment ranges from dump trucks, large front-end loaders, large Uke rock hauling dump trucks, and personal vehicles. The INSPECTOR must be aware of the traffic patterns in the quarry. In most quarries, there is a different traffic pattern for the quarry pit. In some cases vehicles drive on the left side instead of the right.
- The quarry quality control lab and environment houses several dangers the inspector should be aware of. The testing equipment used in the lab is very loud when running. Some quarries shield the noise more effectively than others do. Most of the equipment used during splitting of the samples are pinch point hazards. These include but are not limited to sample splitters, shovels where the handles are loose, sampling ring, and loaded sample bags.
- Quarries and pits are dusty locations. There is the danger of breathing in fine dust present on the producer site.

Equipment Required for Aggregate Sampling:

- PVC sampling tube for sand and screenings
- Standard size buckets (for sampling, > 3 gallon or 5 gallon)
- Sieve Gage
- Sampling Shovel
- Canvas sample bags with 35-lb capacity
- Check Sample Ring
- Calibrated weight set used in verifying the QC technicians small scales used in weighing soil and screening samples. This would be a set of gram weights.

M&T Inspector's Duties for Aggregate Inspection:

1. Meet with the certified sampler or tester at the facility and proceed to compare test results. Generally, sampling procedures are outlined in the Aggregate Control/Quality Assurance Program booklet. The Materials Inspector ensures that a certified technician is on site at all times when materials are being shipped to a present or future NCDOT Right of Way.
2. Clean Coarse or Fine Aggregate for use in products such as asphalt, concrete, and block. Aggregate Base Course (ABC) is any type of Aggregate Base, including cement treated, that are used on any NCDOT Maintenance or Contract project. There are three types of samples that are taken at the quarry, Quality Control (QC), Verification (V), and QA Splits (QA). The lot size for a QC sample is 2,000 tons, for a V sample the lot size is 10,000 tons, and the lot size for a QA Split sample is 20,000 tons for each size of material shipped, or a minimum of one sample per week. The minimum size sample for aggregates is 20 pounds for coarse aggregate, 10 pounds for fine aggregate, and 35 pounds for base materials. For QA Split samples, the sample size listed above should be doubled, 40 pounds, 20 pounds, and 70 pounds, respectively.

3. The Materials Inspector should make bi-weekly visits to the producer at random intervals. On the visit the Materials Inspector should obtain a sample of all material shipped to NCDOT projects. To get the sample, the Materials Inspector goes to the stockpile with the certified QC technician and ensures the sample is obtained properly. The method of proper sampling is outlined in the Aggregate Quality Control/ Quality Assurance Program Exhibit G.
4. As outlined in the Aggregate QC/QA Assurance Program, statistical analysis is conducted by the Quality Assurance Engineer. For non-compliance verification samples, 2 sieves on clean stone and 3 sieves on ABC (not including soil mortar) or fine aggregate must have statistical means that do not compare. If individual samples are out of Specification, document the information and share with the quarry on the next visit. If the problem persists for more than 3 samples, notify the SMS and Quality Assurance Engineer.

Standards:

Sample Prep and Submittal:

Documentation Submittal: