



MEMORANDUM

GENERAL SUBJECT: Revisions to Manual of Instructions, Geotechnical and Aggregate Sections	NUMBER: MD 362-13
SPECIFIC SUBJECT: Revisions to Manual of Instructions, Soil Lab Testing 304.01, and Aggregate Sections 308.05(e), 309.01, 309.05 (new), and 309.06 (new)	DATE: October 28, 2013
DIRECTED TO: District Materials Engineers	SIGNATURE: Charles A. Babish, PE <i>Signature on original copy of memorandum</i>

This Memorandum notifies the users of the Materials Division Manual of Instructions that Section 304.01 regarding CBR tests has been modified as VTM-8 now covers selecting results of CBR tests; that Section 308.05(e) regarding moisture sampling of cement-treated aggregate has been revised to clarify when to sample for water content; that Section 309.01(d)(7) regarding density control of MSE wall reinforced fill has been revised to correct a typographical error; that a new Section 309.05 has been added that provides sampling and testing requirements for using Crushed Hydraulic Cement Concrete (CHCC) for use as road subbase and aggregate base, and clarifies its use as embankment fill; and that a new Section 309.06 has been added that provides recommendations for field compaction of #10 tertiary screenings, often referred to as stone dust. The primary goal is to achieve the maximum dry density for these specific types of aggregate materials. It requires no changes to specifications.

The revised sections are included below.

The Manual of Instructions may be accessed chapter by chapter by using the link below:

<http://www.virginia-dot.org/business/materials-download-docs.asp>

304.01 Soil Laboratory Testing

Modify the 6th paragraph as follows:

~~CBR testing shall be in accordance with VTM-8., which directly references AASHTO T 193. Corrections shall be made to the stress versus strain curve, when applicable, as shown by Method T-193. Additionally, when the CBR value calculated for 0.2 in penetration is greater than the CBR value calculated for 0.1 in penetration, the test shall be rerun, as required by Method T 193.~~

Section 308.05 Sampling, Testing, and Acceptance of CMA

(e) Treating with Cement

When these materials are treated with cement at the pugmill, sampling of materials shall be the same as outlined in Paragraphs (a) and (b) above, except the sampling for gradation *and* Atterberg Limits ~~and water content~~ shall be done before the cement is added. *The sample for water content however shall be taken from the same sample used for titration, after the cement is added, to better ensure accurate representation of water in the cement-treated product.* The cement content shall be determined in accordance with VTM-40 and Sec. 307.05(b) of the VDOT Road and Bridge Specifications.

Section 309.01 Density Control

(d) Frequency of Field Density Tests

(7) Mechanically Stabilized Earth (MSE) Walls

~~Walls Less~~ *Walls* ~~less~~ than 100 linear ft. a minimum of one (1) test every other lift shall be performed. The testing shall be performed a minimum distance of *three (3)* ~~8~~ ft. away from the face of the wall, to within three (3) feet of the back edge of the zone of the reinforced fill area. Test sites shall be staggered throughout the length of the wall to obtain uniform coverage. Testing shall begin after the first two (2) lifts of reinforced fill have been placed and compacted.

Walls more than 100 linear ft., a minimum of two (2) tests every other lift not to exceed 200 linear ft. shall be performed.

Section 309.05 Use of Crushed Hydraulic Cement Concrete for Embankment Fill, Subbase or Aggregate Base Material

Crushed Hydraulic Cement Concrete (CHCC) may be used as embankment fill per the requirements of Section 303, Earthwork, of the VDOT Road and Bridge Specifications.

In order to use CHCC as subbase or aggregate base material, it must be properly sampled, tested, and maintained. The first step in accomplishing this is to classify CHCC into one of two categories based upon its origin, either Known Source CHCC or Unknown Source CHCC.

Known Source CHCC is CHCC from VDOT demolition projects, such as when concrete pavement or bridge components are being removed or replaced. To maintain Known Source status this material must be stockpiled separately from Unknown Source material.

Unknown Source CHCC is CHCC from unknown or multiple sources, such as curb and gutter or sidewalk material, or demolition of commercial or residential structures, washout/bring back from concrete trucks, and CHCC composed of material from multiple sources.

CHCC shall be sampled to ensure that source properties are consistent and meet the VDOT requirements as stated in Section 208 of the VDOT Road and Bridge Specifications, Subbase and Aggregate Base Material. These samples shall be obtained during the crushing of the CHCC stockpile to ensure that the entire stockpile is adequately tested. Samples shall be obtained either from the belt feeding the stockpile or from material after it has been placed on the stockpile. Each sample shall weigh from 75 to 100 lbs. If samples cannot be obtained during the construction of the stockpile, then samples shall be obtained from a completed stockpile in accordance with the following procedure:

- (1) The completed stockpile shall be measured and the total tonnage of material determined to a reasonable accuracy, to within at least 500 tons.*
- (2) The total tonnage shall be divided by the sampling frequency for the type of CHCC to determine the number of source property samples to obtain.*
- (3) The samples shall be obtained from the stockpile in the manner described in Sec. 308.05(a). The samples shall be obtained by a Certified Central Mix Aggregate Technician or a VDOT Materials Representative.*
- (4) The stockpile shall have been sampled no more than two (2) years prior to the start of its incorporation into the project construction, and at least one (1) time per year thereafter during the course of the project to ensure its source properties meet specification requirements.*

CHCC samples obtained for source property testing shall be tested in accordance with Section 208 of the VDOT Road and Bridge Specifications.

Sampling, testing, and inspection for acceptance of lots of subbase or aggregate base material, whether consisting solely of CHCC or a mixture of virgin aggregate and CHCC, shall be handled in the same manner as for dense-graded aggregate per Secs. 308 and the rest of this Sec. 309 and Section 208 of the VDOT Road and Bridge Specifications, except that liquid limit requirements will be handled as per the VDOT Special Provision for "CHCC (Used as Subbase and Aggregate Base Material)".

Section 309.06 Compaction of #10 Tertiary Screenings (Stone Dust)

This section provides recommended guidance on compacting #10 tertiary screenings material without any + No. 4 material and with less than 14% - No. 200 material (plus allowing for process tolerance). Field use of this material shows it compacts best at water contents dry of optimum (specifically it often compacts best at about 7% water and achieving compaction is typically difficult at water contents greater than 10%) and that achievement of maximum dry density in the field is relatively insensitive to a moderate range of water contents.

Therefore, it is recommended that for mixes of this material with a laboratory optimum water content greater than 9%, the field optimum water content be established as 8.5%. Thus, water content in the field would be controlled to 8.5% +/- 2 points, or 6.5% to 10.5%, with the expectation that it will be compacted on the dry side of optimum. For pay purposes, the field optimum water content of 8.5% shall be used. The maximum dry density to be obtained in the field shall still be the maximum dry density corresponding to the laboratory optimum water content.

The District Materials Engineer has the discretion to preclude any mix of #10 tertiary screenings for a particular application due to it being unsuitable material for other reasons in addition to or besides unique water content and density controls.

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