



Florida Department of Transportation

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M E M O R A N D U M

DATE: April 27, 2016

TO: Specification Review Distribution List

FROM: Dan Hurtado, P.E., State Specifications Engineer

SUBJECT: Proposed Specification: **4551508DB Structures Foundations.**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Juan Castellanos of the State Construction Office to update the language for current Department practice.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or online at

<http://www2.dot.state.fl.us/ProgramManagement/Development/IndustryReview.aspx> .

Comments received after **May 25, 2016**, may not be considered. Your input is encouraged.

DH/dt

Attachment

STRUCTURES FOUNDATIONS.**(REV4-18-16)**

SUBARTICLE 455-15.8.2 is deleted and the following substituted:

455-15.8.2 Polymer Slurry for Shafts for Sign, Signal, Lighting and ITS Structures: Materials manufactured expressly for use as polymer slurry for drilled shafts may be used as slurry for drilled shaft excavations installed to support sign, signal, lighting and ITS structures. A representative of the manufacturer must be on-site or available for immediate contact to assist and guide the construction of the first three drilled shafts at no additional cost to the Department. This representative must also be available for on-site assistance or immediate contact if problems are encountered during the construction of the remaining drilled shafts. The Engineer will not allow polymer slurries during construction of drilled shafts for bridge foundations. Use polymer slurry only if the soils below the casing are not classified as organic, and the pH of the fluid in the hole can be maintained in accordance with the manufacturer's published recommendations. Submit the SDS for the product, the manufacturer's published mixing procedures, and the manufacturer's published range of values for pH and viscosity of the mixed slurry. Provide documentation that the polymer slurry and components meet the following requirements:

1. The polymer slurries to be used on the project and their waste products are classified as non-hazardous as defined by Resource Conservation and Recovery Act (RCRA) Subpart C rules, Table 1 of 40 CFR 261.24 Toxicity Characteristic.
2. Pull out tests demonstrate the bond between the bar reinforcement and the concrete is not materially affected by exposure to the slurry under typical construction conditions, over the typical range of slurry viscosities to be used.
3. Load tests demonstrate the bond between the concrete and the soil is not materially affected by exposure to the polymer slurry under typical construction conditions, over the typical range of polymer slurry viscosities to be used ~~for the project versus affect of exposure to mineral slurry.~~
4. The method of disposal meets the approval of all federal, state and local regulatory authorities.

Perform the following tests on the polymer slurry in the shaft excavation and ensure that the results are maintained within the ranges stated in the table below:

| Mixed Polymer Slurry Properties | | |
|---------------------------------|---|--|
| Item to be measured | Range of Results at 68°F | Test Method |
| Density | 62 to 65 lb/ft ³ (fresh water) 64 to 67 lb/ft ³ (salt water) | Mud density balance: FM 8-RP13B-1 |
| Viscosity | Range Published By The Manufacturer for Materials Excavated | Marsh Cone Method: FM 8-RP13B-2 |
| pH | Range Published By The Manufacturer for Materials Excavated | Electric pH meter or pH indicator paper strips: FM 8-RP13B-4 |

Use when Geotechnical Services
are required for the project.

| Mixed Polymer Slurry Properties | | |
|---------------------------------|--------------------------|--------------|
| Item to be measured | Range of Results at 68°F | Test Method |
| Sand Content | 0.5% or less | FM 8-RP13B-3 |

Polymer slurry may be mixed in the cased portion of the shaft in accordance with the manufacturer's published procedures. Test and verify the polymer slurry meets the above requirements before continuing the excavation below the casing.

During construction, maintain the level of the slurry at a height sufficient to prevent caving of the hole. At any time the wet construction method of stabilizing excavations fails, in the opinion of the Engineer, to produce the desired final result, discontinue this method of construction, and propose modifications in procedure or alternate means of construction for acceptance.

SUBARTICLE 455-17.6.1.2 is deleted and the following substituted:

455-17.6.1.2 Procedure: Perform CSL testing at least 120 ~~between 72 hours after and 25 calendar days of~~ shaft concrete placement ~~and after the concrete compressive strength exceeds 3,000 psi.~~ Furnish information regarding the shaft, tube lengths and depths, construction dates, and other pertinent shaft installation observations and details to the Department at the time of testing. Verify access tube lengths and their condition in the presence of the Department, at least 24 hours prior to CSL testing. If the access tubes do not provide access over the full length of the shaft, repair the existing tube(s) or core additional hole(s), as directed by the Engineer, at no additional cost to the Department.

Pull the probes simultaneously, starting from the bottoms of the tubes, over an electronic depth measuring device. Perform the CSL tests with the source and receiver probes in the same horizontal plane. Continuously record CSL signals at depth intervals of 2.5 inches or less from the bottom of the tubes to the top of each shaft. Remove all slack from the cables prior to pulling to provide accurate depth measurements in the CSL records.

Report any anomalies indicated by longer pulse arrival times and significantly lower amplitude/energy signals to the Engineer and conduct further tests as required to evaluate the extent of possible defects. Conduct offset CSL measurements between all tube pair combinations in any drilled shafts with 30% or greater in velocity reduction. Record offset measurements with source and receiver vertically offset in the tubes. These measurements add four measurements per tube combination to the horizontal measurements described in this section. Offset measurements are described by the angle (in degrees) and direction the signal travels between the probes with respect to the horizontal plane: plus 45, plus 22.5 (source below receiver), and minus 45, minus 22.5 (source above receiver). Record offset measurements from the point where the higher probe is at least 5 feet below the velocity reduction to the point where the lower probe is at least 5 feet above the velocity reduction. Provide offset CSL logs and 3-D tomographic analysis of all CSL data at no additional cost to the Department in the event 30% or greater in velocity reductions are detected.

ARTICLE 455-51 is deleted and the following substituted:

455-51 Foundation Certification Packages

Submit two copies of a letter signed and sealed by the GFDEOR to the Engineer certifying each foundation unit has the required axial capacity, lateral stability and integrity, and settlements will not affect the functionality of the structure. A separate Foundation Certification Package must be submitted for each foundation unit. The foundation unit is defined as a group of piles per wall segment or per full wall. Every auger cast pile must be certified and the certification accepted before continuing with the construction of any structural element over the foundation unit. Each Foundation Certification Package shall include all auger cast pile logs, the Department spreadsheet properly completed for every auger cast pile and the grout strength test results of the lots sampled. Correct all integrity problems and noncompliance issues prior to submitting the certification packages. The certification shall not be contingent on any future testing or approval by the Engineer. Within three working days, excluding weekends and Department observed holidays, after receipt of the Foundation Certification Package, the Engineer will examine the records and determine the acceptability of the auger cast piles. The Engineer will reject any certification package that is incomplete or indicates noncompliance with the specifications without the issue being corrected to the satisfaction of the Engineer.

If any auger cast pile is found to be deficient, correct the deficiency (i.e. repair or replace the auger cast pile) and/or modify the design to compensate for the deficiency. In case of disagreement of test results, the Engineer's results will be final and used for determination of acceptance.

After meeting the time requirements of 455-44(15), the Contractor may place panels prior to a complete submittal of the Certification Package at ~~it~~their own risk. If the Engineer determines that verification testing is needed, the Contractor ~~she~~will perform all work and provide all labor, at no additional ~~expense~~cost to the Department, ~~any work and labor~~ necessary to allow access to the piles ~~need~~requiring verification. Replace, or redesign and re-construct, to the satisfaction of the Engineer, any foundation found to be unacceptable after submittal of the certification packages or after verification testing, at no ~~expense~~cost to the Department.