

New Jersey
Department of Transportation

Standard Specifications 2016

New Jersey Department of Transportation

1035 Parkway Avenue, PO Box 600, Trenton, New Jersey 08625-0600



Baseline Document Change Announcement

ANNOUNCEMENT: BDC15S-13

DATE: September 22, 2016

SUBJECT: Drilled Shaft Foundations related changes
- Revision to Section 503 of the 2007 Standard Specifications for Road and Bridge Construction.

Section 503-Drilled Shaft Foundations of the 2007 Standard Specifications has been revised to the following after a rigorous research on the subject.

The following revisions have been incorporated into the Standard Input SI2007 as of September 22, 2016.

SECTION 503 – DRILLED SHAFT FOUNDATIONS

503.01 DESCRIPTION

This Section describes the requirements for installing and testing drilled shafts.

503.02 MATERIALS

503.02.01 Materials

Provide materials as specified:

Concrete	903.03
Self Consolidating Concrete (SCC)	903.06.01
Grout.	903.08.02
Reinforcement Steel	905.01.01
Drilled Shaft Casing	906.03
Steel Tube.....	906.08
Structural Steel Paint (Organic Zinc).....	912.01.01
Water.....	919.08

Provide clay-mineral based slurry (processed attapulgite or bentonite) for mineral slurry. Ensure that the mineral slurry has a mineral grain size that will remain in suspension and has sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. Ensure that the percentage and specific gravity of the material used to make the mineral suspension is sufficient to maintain the stability of the excavation and to allow proper concrete placement.

Provide polymer slurry as recommended by the manufacturer.

Perform control tests on the mineral slurry in the presence of the RE to determine density, viscosity, and pH. Adjust the slurry to meet the requirements shown in Table 503.02.01-1:

Also include the tests to be performed, the frequency of those tests, the test methods, and the maximum and minimum property requirements that must be met to ensure that the slurry meets its intended functions. Ensure that test reports are signed, and provide them to the RE on completion of each drilled shaft.

- H. Rock Socketing.** If subsurface exploration is required, core drill and obtain samples of rock in accordance with ASTM Standard D2113. Prepare the boring logs and place the rock samples in core boxes, mark and pack them in accordance with ASTM Standard D5079. Submit the results of the test borings and photographs of each labeled core box to the Department prior to Drilled Shaft excavation. Perform Unconfined Compressive Strength test on a minimum of four samples retrieved from each boring. Submit the results of Unconfined Compression test results. The Department will evaluate the Rock Mass Strength and classify the rock with GSI and Hoek-Brown failure criterion based on AASHTO LRFD Bridge Design Specifications, 2014.

If the top surface of the sound rock is found to be inclined across the width of the shaft, immediately notify the RE.

Prepare rock socket for concrete placement by roughening with drilling tools or by overreaming. Rotate roughening tools against the rock socket area to remove accumulated slurry cake, to scale off loose rock fragments, and to roughen the finished rock socket surface.

- I. Excavation Cleaning and Verification.** Unless otherwise approved by the RE, ensure that at least 50 percent of the base of each shaft has less than 1/2 inch of sediment at the time of concrete placement. Ensure that the maximum depth of sediment or debris on the base of the shaft does not exceed 1-1/2 inches.

In the presence of the RE, determine the cleanliness of the bottom of the shaft by the use of sounding, probe data, miniature drilled shaft inspection device (mini-SID), tape with weight, or other methods approved by the RE. After final cleaning, determine the dimensions, depth, and alignment as directed by the RE. For uncased drilled shafts, determine shaft dimensions, depth and alignment with a sonar caliper. Inspect the bottom of each shaft including demonstration shaft before and after placing the rebar cage in the drilled shaft. If the cleanliness of the excavation does not meet the requirements, remove the rebar cage and clean until the above requirements are satisfied.

- J. Constructing Reinforcement Steel Cages.** Completely assemble and place the reinforcement steel cage, consisting of longitudinal and transverse bars, ties, cage stiffeners, spacers, centralizers, and other necessary appurtenances as a unit shown on the Plans immediately after the excavation is inspected and approved and immediately prior to concrete placement.

Use concrete spacers or other approved noncorrosive spacing devices at sufficient vertical intervals, near the bottom, and at intervals not exceeding 10 feet up the shaft, to ensure concentric location of the cage within the shaft. If the size of the spacers is not shown on the Plans, provide spacers that will create a minimum 3-inch annular space. Ensure that flat or crescent shaped centralizers ("sleds") are not used in an uncased shaft.

Provide reinforcing cage bottom support to ensure that the bottom of the cage is maintained at the specified distance above the base. Use approved non corrosive devices such as cylindrical concrete feet, mortar or plastic chairs as the bottom supports.

- K. Concrete Placement.** Place concrete according to the limitations specified in 504.03.02.C. Place the concrete within 24 hours after completing all excavation, cleaning the shaft bottom, inspecting and finding it satisfactory. Place concrete immediately after placing reinforcing steel cage and inspecting and finding it satisfactory. Continuously, place the concrete from the bottom of the shaft excavation to the top elevation of the shaft.

- L. Time Limitations.** Ensure the concrete placement in the shaft is completed within 2 hours.

The RE may allow the concrete placement time to exceed 2 hours if the Contractor demonstrates that the slump of the concrete will be as specified in Table 903.03.06-2 during the entire time of concrete placement.

In cases when Self-Consolidated concrete is used, the RE may allow the concrete placement time to exceed 2 hours if the Contractor demonstrates that the slump flow of the Self Consolidated concrete will be as specified in Section 903.06.01B.

- M. Concrete Placement Methods.** Place the concrete using tremie pipe method or pump method from the bottom of the excavation. Do not allow the concrete placement by free fall method.

Check the elevation of the top of the steel cage before, during, and after concrete placement. If the final upward displacement of the rebar cage exceeds 6 inches or if the downward displacement exceeds 3 inches, the RE will reject