

4550000 STRUCTURES FOUNDATIONS
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Jack Cutrer

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Comments: (6-29-12)

1. Based on the below information regarding revisions to the drilled shaft specification, it appears as though the Department is no longer allowing the use of the dry construction method for drilled shafts installed to support mast arms, cantilever signs, overhead truss signs, high mast light poles or other miscellaneous structures. By altering the location of the verbiage for introduction of slurry (mineral or polymer) prior to drilling below bottom of casing (originally under "Wet Construction Method" and now under "General Methods & Equipment"), it appears FDOT is requiring the use of slurry, or wet construction method; but I wanted to see if this was the true intent.

Response:

You are correct, the intent is to prevent sidewall instability, and thereby protect the subgrade supporting the adjacent roadway where the dry construction method should not be attempted (i.e., most of Florida). It is however recognized that there is a relatively small number of locations where the dry construction method may be suitable for the full depth of the shaft. Therefore, the following has been added to the paragraph: "Do not attempt to excavate the shaft using the dry construction method unless the Plans indicate the dry construction method may be suitable for this foundation." The Soils & Foundations Handbook will be revised to request designers indicate on the plans when using the dry construction method would be appropriate, based on the borings performed for the project. Change made.

2. Additionally, could you clarify the proposed changed for the wording in the polymer slurry spec (455-15.8.2) to say "provide documentation" rather than "certify"? Does this mean the Department is allowing contractors the use of uncertified polymer slurry as long as documentation can be provided showing that it meets required spec testing ranges?

Response:

No, The intent is to require technical data sheets published by the manufacturer rather than a letter from the contractor. No change made.

Just wondering if this change has something to do with the fact that no one seems to be able to get FDOT certified for polymer slurry even though product documentation details proper test ranges.

Response:

The original language was essentially copied from Caltrans' approval requirements which were proposed to FDOT by one of the polymer slurry manufacturers. These requirements were reviewed and approved by four polymer slurry manufacturers before being offered for Industry Review in (approx) the Fall of 2008. In 2008, representatives of all four of those manufacturers stated they could meet all of those requirements. The verbiage change was suggested by the State Construction Office to address a question from a Drilled Shaft Inspector. The commenter is apparently mistaken; last sentence in the comment is not factual. No change made.

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Comments: (6-28-12) I believe the highlighted “and” should be replaced with “however,”. That way it is clear which Spec requirement takes priority if there ever should arise a case where there is a conflict with the 8 inch embedment Spec requirement and one of the options of the first Spec requirement in the sentence (1.5” above or 4” below). If “and” is left in then both portions of the Spec carry equal weight and offers no indication of which should take priority if the conflict the Spec is planning to avert actually occurs.

455-5.15.4 Elevation: Ensure that the final elevation of the pile head is no more than 1 1/2 inches above, or more than 4 inches below, the elevation shown in the plans, *and in no case shall the pile be embedded less than 8 inches into the cap or footing.* ~~Do not embed the pile less than 6 inches below the elevation shown in the plans unless a minimum penetration requirement is shown.~~

Response:

The standard detail in the Plans is never less than 12” of required embedment, therefore, “and” is the original intent. However, changing “and” to “however” may make the text read more smoothly. Change made.

Jason Watts
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Comments: (7-3-12) **Current Changes:**

455-5.15.5 Deviation From Above Tolerances: When the Contractor has failed to meet the above tolerances, the Contractor may *propose a redesign to incorporate piles driven out of tolerance into request design changes in the pile caps or footings to incorporate piles driven out of tolerance.* ~~Bear the expense of redesign and Unforeseeable Work resulting from approved design changes to~~ *Incorporate piles driven out of tolerance at no expense to the Department.* Ensure the Contractor’s Engineer of Record performs any redesign and signs and seals the redesign drawings and computations. Do not begin any proposed ~~construction~~ *redesign* until *the redesign* it has been reviewed for acceptability and approved by the Engineer.

Current Changes Accepted:

455-5.15.5 Deviation From Above Tolerances: When the Contractor has failed to meet the above tolerances, the Contractor may propose a redesign to incorporate piles driven out of tolerance into pile caps or footings. Incorporate piles driven out of tolerance at no expense to the Department. Ensure the Contractor’s Engineer of Record performs any redesign and signs and seals the redesign drawings and computations. Do not begin any proposed construction until the redesign has been reviewed for acceptability and approved by the Engineer.

Central Office Legal Recommendations:

455-5.15.5 Deviation From Above Tolerances: When the Contractor has failed to meet the above tolerances, the Contractor may propose a redesign to incorporate ~~out of tolerance~~ piles driven out of tolerance into pile caps or footings, ~~Incorporate piles driven out of tolerance~~ at no expense to the Department. Ensure the Contractor's Engineer of Record performs any redesign and signs and seals the redesign drawings and computations. Do not begin any proposed construction until the redesign has been reviewed for acceptability and approved by the Engineer.

Response:

Change made as recommended by Central Office Legal.

Andy Harper

Comments: (7-10-12) 455-12.13 Payment Items: Item number 455-133- Steel Sheet Piling – per square foot. This pay item is worded different than the BOE.

Response:

Removed the word “Steel” to make wording consistent with the BOE.

Paul Passe

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Comments: (7-3-12) Under 455-15.1.3 General Methods & Equipment: "Provide drilling tools with a diameter not less than 1 inch smaller than the shaft diameter required in the plans." shouldn't "not less than 1 inch smaller than" be "not more than 1 inch smaller than".

Response:

No, "not more than 1 inch smaller than" could be misinterpreted as ‘not larger than 1 inch smaller than ...’ However, I understand that "Provide drilling tools with a diameter not less than 1 inch smaller than the shaft diameter required in the plans." could be (intentionally?) ‘misunderstood’ as "Provide drilling tools with a diameter at least 1 inch smaller than the shaft diameter required in the plans." Therefore, the text will be rephrased to "Provide drilling tools with a diameter not smaller than the shaft diameter required in the plans minus 1 inch."

Stefanie Maxwell

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Comment: (7-24-12) Because a “Protection of Existing Structures” pay item exists, I recommend that it be used and not be included in the cost of another item, even if the existing structure is a bridge owned by FDOT. This was recommended at a LESS Committee Meeting several months ago. I propose that the following language in Subarticles 455-11.11, 455-24.7(new), 455-37.1, and 455-50.1 be deleted: 455-11.11 When the Contract Documents do not include an item for protection of existing structures, the cost of settlement monitoring as required by these Specifications will be included in the cost of the piling items; 455-24.7 Protection of Existing Structures: When the Contract Documents do not include an item for protection of existing structures, the cost of settlement monitoring as required by these Specifications will be included in the cost of Unclassified Shaft Excavation; Excavation; 455-37.1 Protection of Existing Structures: When separate payment for Protection of Existing Structures is provided, When a

separate payment for Protection of Existing Structures is not provided, the cost of this work will be included in the Contract unit prices for Excavation for Structures and/or for Concrete (Substructure). 455-50.1 Protection of Existing Structures: When separate payment for Protection of Existing Structures is provided, When a separate payment for Protection of Existing Structures is not provided, the cost of settlement monitoring will be included in the cost of the structure.

Response:

This will be considered for a possible future change. No change made.

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Wing Heung

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Comment: (7-24-12) Type: 4550000 Text:

1) For structures without test piles current change in 455-5.11.7 includes the following “When using externally mounted instruments, allow the Engineer one work day after driving the dynamic load tested piles for the Engineer to complete the signal matching analyses and determine the driving criteria for the subsequent piles in the bent or pier.” a./ Suggest to change the phrase “allow the Engineer one work day” to “allow one work day”. b./ Why was externally mounted instruments mentioned only herein but not the EDC? Unless 100% EDC is used, there is probably also a certain required time to perform the analyses to develop the driving criteria. Suggest to allow for 1 work day for both systems.

Response:

The submitted change has been reviewed by the EDC manufacturer, and they are agreeable to providing the information the same day. No change made.

2) On 455-15.7, one of the changes currently shows “When the shaft extends above ground or through a body of water, the Contractor may form the portion exposed above ground or through a body of water, with removable casing except when the Permanent Casing Method is specified (see 455-22.7).” It appears that the reference of 455-22.7 is incorrect, since the reference does not exist in 455 specifications. Is it meant to be 455-23.7 or 455-15.5 ?

Response

This specification has historically referenced the language now in 455-23.7. Change made.

3) On 455-18 and the new 455-24.4 “test hole” is implied to be the same as “test shaft”. It is probably a matter of terminology but usually a “test hole” do not have load test (Statnamic or Osterberg etc), in contrary to “test shaft” which probably imply otherwise. Suggest to consider calling “test hole” as “method shaft” instead.

Response

We often refer to test holes as “test shafts” and shafts for load tests as “Load Test Shafts,” however, we also use the term Method Shaft to better clarify the purpose of the initial test shaft when needed. I agree it would be clearer to replace “(test shaft” with “(method shaft).” Change made.

4) On 455-5.11.1 and 455-5.11.7, there are three locations showing “work day” which should be “working day” (typo errors)

Response

Agree. Change made.

5) The proposed 455-5.11.7 shows “When locations are not shown on the plans, allow for dynamic load tests at 5% of the piles at each bent or pier.” Suggest to append the sentence with “(round up to the next whole number)” to avoid subjective interpretation in case the number of piles are not in multiples of 20s.

Response

Agree. Change made.

6) The proposed 455-7.2 shows “When EDCs will be used for dynamic load testing, supply and install in square prestressed bridge foundation piles in accordance with Design Standards Index No 20602.” Suggest to replace the phrase “bridge foundation” with ‘concrete’. In that way, it will be more encompassing for other applications besides “bridge foundations”

Response

Agree. Change made.

7) The proposed 455-11.4 shows “Other extensions of piles, additional length paid for splicing and build-ups will be included in the quantities of regular Piling and will not be paid for as Test Piling.” Suggest to replace the phrase “Other extensions of piles” with “For other extensions of piles”.

Response

Disagree. No change made.

8) The proposed 455-15.1.3 “General Methods & Equipment” currently has a new paragraph moving from the previous 455-15.3 “Wet Construction Method” on miscellaneous shafts having premixed mineral slurry or polymer slurry before the drill advances to the bottom of casing. With the new location of this paragraph as a general requirement, even if a dry hole is encountered or if a full length temporary casing is used, the slurry will still be required for miscellaneous shafts. Is there a need to clarify on the issue giving these cases exceptions?

Response

As stated in the response to a previous comment:

The intent is to prevent sidewall instability, and thereby protect the subgrade supporting the adjacent roadway where the dry construction method should not be attempted (i.e., most of Florida). It is however recognized that there is a relatively small number of locations where the dry construction method may be suitable for the full depth of the shaft. Therefore, the following has been added to the paragraph: “Do not attempt to excavate the shaft using the dry construction method unless the Plans indicate the dry construction method may be suitable for this foundation.” The Soils & Foundations Handbook will be revised to request designers indicate on

the plans when using the dry construction method would be appropriate, based on the borings performed for the project. Change made.

9) On 455-42. Item 7 shows. "Use a grout pump/system equipped with a pressure gauge to accurately monitor the pressure of the grout flow. Test and calibrate the equipment during construction of the demonstration pile to demonstrate flow rate measurement accuracy of plus or minus 3% over the range of grouting pressures anticipated during this work." The phrase "flow rate" usually implies volume per unit time (e.g. cu ft or gallons per minute). Since a positive displacement pump is required, the more important factor is the pump calibration factor (volume per stroke). Is the plus or minus 3% accuracy referred to the pump calibration factor and not the flow rate ? Also, I am not aware of a way to do it under a range of grouting pressures.

Response:

Agree. The first two sentences have been revised to:

"Use a grout pump/system equipped with a pressure gauge to accurately monitor the volume and pressure of the grout flow. Test and calibrate the equipment during construction of the demonstration pile to demonstrate flow volume measurement accuracy of plus or minus 3% over the range of grouting pressures anticipated during this work." Change made.

D4 Construction

Comments: (7-26-12)

This spec addresses concerns for adjacent structures due to foundation work. We still need a spec that can address other types of work that could impact adjacent structures such as drainage installation and roadway compaction. Suggest that the language used here for protection of structures belongs in a general area such as Division 1 or else include this in other sections of the spec. as needed depending on the operation.

Response:

Comment noted, however, this revision is only for Specification 455. No change made.

455-19 Test Bells: In lieu of leaving in and stating they are no longer used, suggest deleting the section entirely. I know this means you have to re-number the following sections.

Response:

Agree. However, the revision is intended to prevent the need for renumbering the remaining 84(+/-) headings in the Specification and then finding and correcting all references to those 84(+/-) renumbered headings in all of the other Specifications, Developmental Specifications and Special Provisions before the next Workbook is released. The need for finding and correcting all references in non-specification documents such as the Design Standards, CPAM, etc. would also need to be investigated. This renumbering exercise is not considered a prudent use of Department resources at this time. No change made.

Tom Andres

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Comment: (7-24-12) An additional Pile Installation Plan item is needed for the contractor to specifically address water-hammer for voided piles in the Contractor's submittal requirements.

Response:

The following is added to the list of Pile Installation Plan submittal requirements: “13. Methods and equipment proposed to prevent damage to voided or cylinder piles due to interior water pressure.” Change made.
