

4550502DB SPECIFICATION
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Randy Cropp
Cone & Graham
561-727-3939
Rcropp@conegraham.com

Comments: (2-16-15)

1. 455-5.10.1: Suggest highlighted edits.

→ → → ~~Ensure the~~ pile has achieved minimum penetration, the blow count is generally ~~the same~~ **increasing** and the minimum required bearing capacity obtained for 24 inches of consecutive driving with less than 1/4 inches rebound per blow, or the minimum penetration is achieved and driving has reached practical refusal in firm material. ¶

Response: Change made to “the same or increasing.”

2. 455-5.15.5: Suggest highlighted edits.

→ → ~~455-5.15.5 Deviation From Above Tolerances: Have the Contractor's Specialty Engineer or Specialty Engineer perform an evaluation of the as-built foundation to determine whether a foundation redesign or an increase in the loading requirements of the piles is needed. Include the signed and sealed evaluation as part of the certification package submitted in accordance with 455-5.18. If the evaluation indicates the foundation or the pile load requirements must be modified, Propose a redesign to incorporate out of tolerance piles into pile caps or footings, at no expense to the Department. Submit signed and sealed redesign drawings and computations to the Engineer for review and acceptance. Do not begin any proposed construction until the redesign has been reviewed and accepted by the Engineer. Contractor may continue construction at his own risk.~~ ¶

Response: First Highlight: Change made to Contractor’s Engineer of Record. See comment from Robert Robertson. Second highlight: This is a current requirement. The phrase “ except as noted in 455-5.19” will be added to the end of the last sentence to clarify what can be done at risk. Change made adding “ except as noted in 455-5.19” at the end of paragraph.

3. 455-5.17: Suggest highlighted edits.

→ ~~455-5.17 Recording: Inspect and record all the pile installation activities, including but not limited to handling, jetting, predrilling, preforming and driving on the Department's Pile Driving Record form. Steel piles and dynamically tested concrete piles in accordance with 455-5.13 will not require inspection during handling. Keep a pile driving log for each pile installed whether it is, or is not, instrumented. Within one working day after completing the installation of a pile, submit the Pile Driving Record to the Engineer.~~ ¶

Response: The Department wants the same level of inspections we performed in conventional projects. Handling inspection is important since damages can occur (and have occurred) during this operation. Handling inspection must be part of the DB projects piling inspection the same way it is part of the conventional projects inspection. No change made.

4. 455-5.18: Suggest highlighted edits.

→ 455-5.18 Foundation Certification Packages: Submit *electronically or* two copies of a certification of pile foundations to the Engineer prior to Pile Verification Testing. A separate Foundation Certification Package must be submitted for each foundation unit. A foundation unit is defined as all the piles within one bent or pier for a specific bridge for each phase of construction. Each Foundation Certification Package shall contain an original certification letter signed and sealed by the GFDEOR certifying the piles have the required axial capacity including compression and uplift, lateral stability, pile integrity, and settlement will not affect the functionality of the structure. The package shall also include clearly legible copies of all pile driving logs, EDC records, all supplemental dynamic testing raw data and analyses for the foundation unit, *and the signed and sealed evaluation performed to address out-of-tolerance piles under in accordance with 455-5.15.5.* The certification shall not be contingent on any future testing or approval by Engineer.¶

Response:

First Highlight: An additional sentence has been added at the end of the paragraph to accept electronic submittals in accordance with FAC rule 61G15-23.

Second Highlight. The GFDEOR must consider any deviation from tolerances in order to certify the foundation. The certification package itself must contain this analysis performed by the EOR. The Department or its consultants cannot accept a certification package without a signed and sealed analysis. No change made.

Robert Robertson
414-4267
robert.robertson@dot.state.fl.us

Comments: (2-19-15)

Comments on Cropp comments:

1. 455-5.15.5: First sentence – the evaluation must be by the Contractors EOR. The specialty engineer is not adequate unless he is prequalified as defined under contractors EOR. There is no “contractors engineer” in the definitions.

Response: Change made to Contractor’s Engineer of Record.

2. 455-5.18: if the certification package is completed prior to knowing if all piles not only meet the plan requirements but how they are affected by the actual position then the risk will grow for proceeding. Some piles will pick up substantial load when out of place, others will not. If we are good with this risk then ok but it will take a real fight to force repairs after caps/footings are in place.

Response: See Response to Randy Cropp comment 2. No Change made.

Matthew Musante
407-264-3443

Comments: (2-19-15)

1. Shouldn't this say "20 blows" before the word per again. While I understand what it means, it reads a little confusing and would be more clear if revised?

→ → ~~455-5.10.3 Practical Refusal: Practical refusal is defined as 20 blows per inch, or or per less than one inch (or less penetration,) with the hammer operating at the highest setting of setting determined by the Engineer and less than 1/4 inches rebound per blow. Stop driving as soon as the Engineer determines that the pile has reached practical refusal. The Engineer will generally make this determination within 2 inches of driving. When the required pile penetration cannot be achieved by driving without exceeding practical refusal, use other penetration aids such as jetting or preformed pile holes.~~

Response: Change made to “Practical refusal is defined as 20 blows per inch or less than one inch penetration,…”

2. 455-5.18: Suggest deleting highlighted text.

→ → ~~On land foundation units or water foundation units when the pile cutoff is at least six feet above mean high water, the Contractor may cut-off piles prior to a complete submittal of the Certification Package or prior to a successful completion of the Pile Verification Testing Program, at its own risk. If any piles in a foundation unit are cut-off prior to the submittal of a certification package or completion of the Pile Verification Testing Program and the Engineer determines that verification testing is required, the Contractor shall perform, at no expense to the Department, any work and labor required to expose any pile selected for verification to allow the installation of the instruments in dry conditions and to provide references and access to the Engineer for such testing. Piles experiencing damage during the verification testing or requiring build-up after the verification shall be repaired by the Contractor at no expense to the Department. No pile bent/cap shall be poured prior to successful completion of the Pile Verification Testing Program for that foundation unit or notification by the Engineer that no verification will be required.~~

Response: Agree. Change made.

Michael Kim
FDOT
954-677-7030

Comments: (2-20-15)

455-5.10.3 Practical Refusal: Practical refusal is defined as 20 blows per inch, or per less than one inch penetration, with the hammer operating at the "highest" setting. Comments: Recommend to delete "highest". It doesn't have to be highest. The Engineer will decide the appropriate stoke height.

Response: The proposed language does not just read “highest setting,” but “the highest setting determined by the DTE,” which means the highest setting that the DTE, based on his dynamic load testing, has determined can be used without damaging the piles. This is in agreement with your last two sentences. No Change made.

455-5.11.7 Structures Without Test Piles: For structures without test piles or "100% dynamic testing", the Engineer will dynamically test the first pile(s) in each bent or pier at locations shown in the Plans to determine the "blow count criteria" for the remaining piles. When locations are not shown in the Plans, allow for dynamic load tests at 5% of the piles at each bent or pier (rounded up to the next whole number). If the Engineer requires additional dynamic load tests for comparison purposes, the Contractor will be paid for an additional dynamic load test as authorized by the Engineer in accordance with 455-11.5. Comments: It states "100% dynamic testing" in the beginning of sentence, and it mentions "blow count criteria" later. 100% dynamic testing does not require the blow count criteria. It may be confusing.

Response: The preposition "without" qualifies both "structures without test piles" and "structures without 100% dynamic testing". In this case a blow count criterion is needed for the piles that are not instrumented. No Change made.

Mohamad
MHGRLFL@aol.com

Comments: (2-25-15)

With a design phi-factor of 0.65, the NBR is 1.53 times the factored design load, I am not sure why the hammer needs to be oversized to the extent of 2 times. There are situations where the pile would encounter resistance higher than the required NBR during the process of getting to required minimum tip elevation, but these are special cases and should not dictate general specs Requirements.

Response: This is a requirement that dates back to the specifications of 1994. We are not changing it or adding a new requirement but relocating it. Before LRFD, the specs required hammers to be able to mobilize 3.0 times the design load (plus scour and down drag if applicable) without reaching 20 blows/in. Many years ago after the LRFD came into the picture the Department the language changed to 2.0 times the factored load which is equivalent to the 3.0 times design load rule before LRFD. Relaxing or eliminating this requirement in conventional projects may have consequences and will not be considered. On the other hand, for DB projects we will remove this requirement. Change made by deleting this requirement.

Jose Kandarappallil (via Deborah Ihsan)
FDOT, D4
772-429-4936

Comments: (3-16-15)

1. For Section 455-5.2 Pile Hammers – Recommend removing the statement "and without reaching or exceeding 20 blows per inch", which is being added via this specification change and either fully leaving it out or by instead stating "and without reaching practical refusal".

Response: For hammers requirements, the language we have is correct, and we prefer it the way we phrased it. The suggested change may actually create a conflict if in one particular project the refusal criteria is modified in a document that can overrule the standard specifications.

2. For Section 455-5.8 Penetration Requirements – Recommend adding the following statement

to the end of the last sentence in the third paragraph, “in consultation with the Engineer and per specification 455-5.7.”

Response: The current language in this paragraph has been in the specs since 1994 and we do not find this addition necessary. No Change made.

3. For Section 455-5.10.3 Practical Refusal – Recommend revising the first sentence that with this specification change would state, “Practical refusal is defined as 20 blows per inch, or per less than one inch penetration,” to instead state, “Practical refusal is defined as penetration of one inch or less for 20 blows of hammer,”.

Response: What this comment suggests is equivalent to the language we have. However, the industry is more used to seeing a rate given in 20 blows per inch. No Change made.

4. For Section 455-5.10.3 – Recommend adding the following statement to the end of the last sentence in the first paragraph, “in consultant with the Engineer.”

Response: See response to your comment 2. However, thanks to this comment we noticed a redundant sentence that is not needed now because it is stated in 455-5.8. Change made, deletion to the last sentence.

5. For Section 455-5.19 Verification – Recommend modifying the first sentence of the revised last paragraph that is being revised to state, “On land foundation units or water foundation units when the pile cutoff is at least six feet above mean high water, the Contractor may cut-off piles, prior to a complete submittal of the Certification Package or to a successful completion of the Pile Verification Testing Program, at its own risk.” By instead stating “On land foundation units or water foundation units when the pile cutoff is at least six feet above mean high water, the Contractor may cut-off piles, at their own choice and risk, prior to a complete submittal of the Certification package or prior to a successful completion of the Pile Verification Testing Program.”

Response: We prefer “its.” No Change made.

Katie Kehres (via Deborah Ihsan)
FDOT, D4
772-429-4889

Comments: (3-16-15)

For Section 455-5.19 Verification – Recommend changing “its” for “their” in the second sentence such that it would state, “Based on their review of the certification package, the Engineer may or may not....”

Response: We prefer “its.” No Change made

Brian Hermany (via Deborah Ihsan)
FDOT, D4
561-370-1140

Comments: (3-16-15)

Consider deleting “per” from the text.

Response: Further information received from Brian indicated that the suggested change is

referring to the second “per” in the first sentence of 455-5.10.3. Agreed with the comment. Change made to “Practical refusal is defined as 20 blows per inch or less than one inch penetration,…”

Anonymous
FDOT, D5

Comments: (3-16-15)

1. Section 455-5.19 Verification. I do not recommend cutting off piles until after the completion of the Certification Package or Pile Verification Testing Program. If these pile need to be driven after cut-off it could damage the head of the pile.

Response: We agreed that piles may be damaged if driven after cut-off. That is why we also included the following sentence in the paragraph: “Piles experiencing damage during the verification testing or requiring build-up after the verification shall be repaired by the Contractor at no expense to the Department.” No change made.

2. Section 455-5.17 Recording. Recommend inspecting all piles during handling to help avoid potential problems with pile damage.

Response: The issues we have seen during handling have been in concrete piles. We do not even have an index to follow for pick up points and support points for steel piles. That is why we decided to relax the requirement and not include steel in the handling inspection. Regarding concrete piles, we consider that if they are fully instrumented the dynamic data should be able to recognize if there is preexisting damage prior to driving. No Change made.

Sastry Putcha
214-385-1994
sastry.putcha@radise.net

Comments: (3-18-15)

1: 455-5.2 Pile Hammers: Suggest adding the paragraph below into the section 455-5.2 as the last paragraph: For a pile with embedded top and tip (EDC) instrumentation, hammer application compliance with the specifications is determined by the dynamic test data. The UF method using EDC instrumentation provides accurate estimate of static resistance based on a calculated damping factor for every hammer blow obtained from the measured stress wave characteristics. Therefore, selection of Hammer shall be up to the Contractor when EDC instrumented piles are installed.

Response: We do not consider this change necessary because hammer requirement compliance is always based on dynamic test data, and it would apply not only to EDC but also the external mounted testing. Also, it is understood that FDOT considers both the UF method with EDC instrumentation, as well as the instrumentation method using external sensors, accurate.

Otherwise they would not be included in the specs as dynamic test options. The last sentence would apply to both EDC and external sensors. In any case, to prevent potential problems arising from improperly sized hammers we want to keep the hammer requirement of being able to mobilize the load between 3 and 10 blows/in unless approved otherwise by the Engineer based on satisfactory field trial. For DB projects we will delete the requirement of mobilizing 2 times the FL plus the scour and downdrag without exceeding 20 blows/in requirement. No Change

made.

2: 455-5.10.1 General: Suggest adding the paragraph below into the section 455-510.1 as the second paragraph: For 100% dynamic testing install instruments prior to driving and assist the Engineer in monitoring all blows delivered to the pile (455-5.13)

Response: This change is not needed. Installing the instruments prior to driving and monitoring all the blows, are already requirements for dynamic testing as specified in 455-5.13. In addition, in sub-article 455-5.10.2 we are indicating to follow the methods of section 455-5.13 to determine bearing. No Change made.
