

SP4550000DB STRUCTURES FOUNDATIONS
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Pete Kelley

Comment: (10-26-12) From the proposed 455 revision – “*The GFDEOR shall also supervise and certify the constructed foundations.*”

This does not sound like a provision that should be in any spec. A geotech EOR supervising foundation construction is an unreasonable expectation.

Response: The engineer cannot certify what he does not see or control. This requirement has been in place for all FDOT Design Build projects for many years. It is only being moved from the RFP to the Special Provision. No Change Made.

Keith Waugh

Comment: (10-29-12) 455-5.19 addresses frequency for VT as “in any and all”. Shouldn't VT be to verify the process and not to second-guess the FGDEOR's judgement? "Any and all" is far too broad of a term. 455-10 states that PIP is due “At the preconstruction conference or at least 30 days prior to driving the first pile, submit.” If the FGDEOR has to submit certified concurrence as listed in Item 18, why would FDOT still need 30 days to review? At a maximum, the PIP should be submitted 15 days prior to driving. This would be consistent with plan review times.

Response: 1. 455-5.19 addresses the frequency as 1 per foundation unit (bent or pier) for any and all foundation units. The Special Provision does not indicate “any and all piles.” No change made.

2. The timeframe of 15 days is acceptable. Change made in 455-10, 455-15.1.2 & 455-47.

Wing Heung

Comment: (11-9-12)

1./ 455-1.1 (Adobe file page 3 of 77) shows “When shown in the Contract Documents or when authorized by the Engineer, install the piling to the depth required to minimize the effects of vibrations or ground heave on adjacent structures by approved methods other than driving (preformed holes, predrilling, jetting, etc.)” For consideration, suggest to modify and show “..... or when authorized by Geotechnical Foundation Design Engineer of Record, install the piling” This would be consistent with the current proposed changes on preformed pile holes per 455-5.9.1 and jetting per 455-5.7.

Response:
Agree. Change made.

2./ 455-5.10.7 (Adobe file page 20 of 77) shows items (a) through (g). Specifically, items (e) and (f) are really under item (d) when it refers to “one of the following sets of dynamic load testing conditions”. Is this a format issue when the numberings were assigned? Should items (e) and (f) become say, i or ii under item (d)?

Response:
Agree. Change made.

3./ Is there a reason why “Method of Measurement” and “Basis of Payment” sections of the 455 specifications (455-11, 455-12, 455-23, 455-24, 455-36, 455-37, 455-49, 455-50), are not removed for Design-Build projects, which have lump sum contracts?

Response:

The SCO has determined that the Method of Measurement and the Basis of Payment sections shall remain as is. The need for additional payment, if any, will be covered in other portions of the contract. No change made.

4./ 455-10.1, Item 17 and 455-15.1.2, Item 20 indicate that the Contractor’s representative shall be available within “hours notice”. Is there a missing number of hours or is it on purpose?

Without defining the number of hours, it may not work as intended.

Response:

Agree. Change made to two hours notice.

5./ Several locations in 455-10.1 & 455-17.6.1.5 have typo errors and show “Foundation Geotechnical Design Engineer of Record” instead of “Geotechnical Foundation Design Engineer of Record” (the word “Geotechnical” and “Foundation” are transposed). Please do a word search on “Foundation Geotechnical”.

Response:

Agree. Changed to GFDEOR.

Woerner, Bert

Comment: (11-15-12)

Design Build Projects are Lump Sum contracts. The Method of Measurement and the Basis of Payment appear to be written for a standard pay item project. The way these items should be written is “The quantity to be paid for will be at the Contract lump sum price.” If there is any additional work needed that could not be anticipated by the contractor, then it should be paid as unforeseeable work.

Response:

The SCO has determined that the Method of Measurement and the Basis of Payment sections shall remain as is and the need for additional payment, if any, will be determined in other portions of the contract. No change made.

Kathy Gray

Comment (10-09-12)

455-5.18 – Recommend revising the 4th sentence of the 1st paragraph to: “A foundation unit is defined as all the piles within one bent or pier for a specific bridge for each phase of construction.”

Response:

Agree. Change made to 455-5.18 & 455-22.2.

455-15.1.2 – Recommend revising format of heading to match 455-10, and changing Drilled Shaft Installation Plan to “DSIP.”

Response:

Agree. Change made

455-15.1.2, Item 20 – How many hours of notice? Suggest a 2 hour time frame.

Response:

Agree. Change made.

455-16.1 – It might be better to just say “inspects the shaft excavation . . .”

Response:

Per SCO, the original language “inspects and accepts” was left in place.

455-22.2 – What about Cantilever and Overhead Sign structures which may not be at an intersection/interchange?

Response:

Agree. Changed to “...or all shafts included in a miscellaneous structure foundation.”

455-22.3 – What is the difference between choosing shafts for verification in this and item 455-22.1 above which allows 2 days to decide?

Response:

Tests performed for 455-22.1 are identified by the Department to be performed by the Contractor before the Foundation Certification Package is submitted. Shafts selected and tested in 455-22.3 are verification tests performed by the Department. No Change Made.

Trey Tillander

24 Comments (11-5-12)

1. Need usage Note for this SP.

Response:

Usage Note: For all projects with structure foundations.

2. Define GFDEOR at first instance of use.

Response:

Agree. Change made. First instance became 455-1.1 after comment by W. Heung.

3. 455-2.11 – Move requirement for TSP from the Specs. Recommend moving to RFP or SDG.

Response:

Agree. Moved to RFP.

4. 455-5.7 – This not the first instance of GFDEOR.

Response:

Agree. Change made.

5. 455-5.10.3 – Is the sentence “Generally make this determination within 2 inches of driving.” Needed? Recommend deleting.

Response:

The SCO has determined this should remain. No change made.

6. 455-5.10.7 – In 2nd sentence of 1st paragraph: recommend deleting “if and only.”

Response:
Disagree. However, “if and” has been deleted.

7. 455-5.13 – Delete item 10. It is very ambiguous.

Response:
Agree. Change made.

8. 455-5.13, 3rd Paragraph – Comma is needed after “instruments.”

Response:
Sentence deleted.

9. 455-5.18 – Is the signed and sealed “certification of pile foundations” the same or different from the “signed and sealed certification letter”? If the same, delete redundant text. Articles 455-26.1 and 455-51 don’t appear to have this same redundancy.

Response:
455-5.18 & 455-22.2 were revised to reduce redundancy.

10. 455-5-19 – Semicolons would work better in this list than commas.

Response:
List revised to accommodate semicolons.

11. 455-10, Item 14 – Recommend deleting “foreman” as this is not defined in 105-8.13.

Response:
105-8.13 has been revised.

12. 455-10.2, 2nd Paragraph – I believe this “the” was meant to be in front of GFDEOR instead of in front of acceptance.

Response:
Agree. Change made.

13. 455-10.2, 3rd Paragraph – Change comma to semi-colon.

Response:
Agree. Change made.

14. 455-15.1.2, Item 1 – Recommend deleting “foreman” as this is not defined in 105-8.13.

Response:
105-8.13 has been revised.

15. 455-15.1.2, Item 20 – Number of hours is missing.

Response:
Agree. Change made.

16. 455-15.1.2.1, 2nd Paragraph – Is the first sentence needed? it seems to be redundant with the 1st Paragraph.

Response:
Sentence deleted.

17. 455-17.6.1.5 – I believe “observed” should be “are observed”.
Response:
Disagree. No change made.
18. 455-17.6.1.5 – Shouldn’t “Foundation Geotechnical Design Engineer of Record” in these sentences be “Geotechnical Foundation Design Engineer of Record” or better yet “GFDEOR”?
Response:
Agree. Changed to GFDEOR
19. 455-17.6.2 – Inserting “generally” is not necessary because it doesn’t change the requirement to the contractor.
Response:
Agree. Change made.
20. 455-22.2 – Is the signed and sealed “certification of drilled shaft foundations” the same or different from the “letter signed and sealed”? If the same, delete redundant text. Articles 455-26.1 and 455-51 don’t appear to have this same redundancy.
Response:
455-5.18 & 455-22.2 were revised to reduce redundancy.
21. 455-47 – Recommend deleting “foreman” as this is not defined in 105-8.13.
Response:
105-8.13 has been revised.
22. 455-47, Item 9 – Is this needed? The Plans are being developed by the D-B Firm, correct?
Response:
This text is included in the 455 in the Workbook. SCO requested this SP only make changes specific to Design-Build type projects. However, the reference to the Plans is deleted since the Plans are developed by the D-B Firm.
23. 455-51 – Why isn’t this inserted into the General Requirements like 2 of the other Foundation Certification Packages subarticles?
Response:
The location was chosen to avoid renumbering articles mirrored in SS455.

Mohamad Hussein
Comments (11-18-12)

1. 455-2.8 (10): Add Thermal Integrity Profile (TIP) results to the list, since this test is becoming used more and more frequently.
Response:
“the results of other integrity tests” was added to the list. Thermal Integrity Testing of Drilled Shafts is normally only performed by the Department.

2. 455-2.11: Replace “Statnamic” with Rapid Load Testing (RLT), since this is the more general (and generic) name that this type of testing is known by and it is the technical name that ASTM (D7383) uses. There are other locations throughout the document that have Statnamic, or Statnamicly tested piles.

Response:

Disagree. Statnamic (ASTM D-7383 procedure A) is the only type of RLT for which the Department has resistance factors. No change made.

3. 455-5.2: Rating the hammer energy based on the theoretical energy of the ram at impact (i.e., kinetic energy) may be technically challenging for diesel hammers without specialized measurements (as is typically done with hydraulic hammers) where preignition and compression of the gases in the chamber, in addition to the mechanical efficiency, and other effects would be difficult to quantify. It might require proximity switches be inserted in the hammer casing, and this is not common practice for diesel hammers; for diesel hammers measuring the stroke (from blows per minute) is general practice. It may be best to leave the hammer rating to the manufacturers, especially for general equipment sizing purposes.

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

4. 455-5.10.1: The ¼ inch rebound should be clarified to mean the soil’s rebound after consideration of the pile’s elastic compression/rebound; otherwise, most piles would not be able to meet this requirement since the pile’s elastic rebound alone is close to ¼ inch, or above. Also, it is difficult for the inspector to visually ascertain ¼ inch rebound on the fast moving pile under the hammer impact, and “set-rebound graphs” are a safety hazard. Alternatively, a limit of ½ inch may be more reasonable, technically and practically. Rebound can be calculated from pile top dynamic test data by taking the difference between maximum pile top displacement (DMX) minus pile set per blow (from the observed/recorded blow count).

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

5. 455-5.10.4 (c): The period of waiting after initial driving to perform a setcheck or restrike should not be dictated in a design/build project environment, and it would not be known ahead of time to be a part of the project contract documents. The GFDEOR should be left the liberty to determine the time of setcheck/restrike that suits the needs for foundation certification based on site specific conditions and project requirements.

Response:

Agree. The determination of time by the GFDEOR is permitted in the existing language. No change made.

6. 455-5.10.7 (c): The relevant phi-factors in the table for dynamic load testing with signal matching can reasonably be increased by 0.1 if all piles in a given bent/pier are tested.

100% setcheck testing in such cases provides considerable amount of information regarding the individual pile's structural and geotechnical in-place conditions that significantly increase confidence, and markedly reduce the uncertainty usually associated with the phi-factors levels currently listed.

Response:

This comment does not consider the intent of 455-5.10.7; the subarticle only addresses the acceptance of piles expected to experience set-up without restriking 100% of the piles. No change made.

7. 455-5.11.1: "Embedded Data Collector (EDC)" should be replaced with a more generic term (such as embedded gages).

Response:

There are two methods of dynamic load tests permitted in this Special Provision.

1. using Embedded Data Collector (EDC) equipment and the UF Method of analysis, or
2. externally mounted instrument system and signal matching analyses.

The reference "EDC" is only used when describing the analysis method and pile fabrication. No change made.

8. 455-5.11.3: Uses Allowable Stress Design (ASD) procedures, which may be inconsistent with contemporary practice, but OK for temporary piles. In ASD, AASHTO allows the use of a factor of safety of 2.25 for dynamic testing on permanent piles, and that should be OK for temporary piles' use.

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

9. 455-5.13: Replace EDC with "internal gages", consistent with the PDA not specifically named and its system being called external gages with bolts in the same section.

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

10. Can cast indentation be mentioned for concrete piles here?

Response:

The SCO requested this SP only make changes specific to Design-Build type projects. When the experiments regarding the indentations are complete, revisions can be incorporated into all documents. No change made.

11. 455-7.2: Replace EDC with embedded gages, and check entire document – replace with generic term.

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

Pam Moore
Comments (11-02-12)

- 1) 455-2.8 – Since this requirement is for load tests on both piles and shafts, driving records and dynamic testing results should be listed among the items to be included.

Response:

Agree. Change made.

- 2) 455-2.9 – The verbiage in the standard spec regarding use of the Department’s load test equipment was deleted. Should the verbiage about returning the Department’s equipment be deleted from this section?

Response:

Agree. Change made.

- 3) 455-5.10.2 – Section 455-5.14.2 is referenced for blow count criteria. The majority of 455-5.14.2 is about production lengths; driving criteria is only mentioned as something which is included in the length letter. Suggest changing 455-5.10.2 to “Drive piles to the blow count criteria established by the GFDEOR and the Dynamic Testing Engineer using the methods described herein, as presented in the Production Pile Length Letter (see 455-5.14.2).”

Response:

455-5.10.2 changed to: “Drive piles to the blow count criteria established by the GFDEOR and the Dynamic Testing Engineer using the methods described herein and presented in the production pile length and driving criteria letter (see 455-5.14.2).”

- 4) 455 -5.10.4 – Since this is design-build, is it necessary to distinguish between set-checks & redrives? Can they both just be referred to as restrikes?

Response:

This historic language is mirrored in Specification 455. SCO requested this SP only make changes specific to Design-Build type projects. No change made.

- 5) 455-5.10.4(c) – Uninstrumented restrikes – Should a minimum number of blows be required, say 15, so that the first low energy blows are not counted as contributing to capacity? If 15 blows minimum, then use last 10 to determine bearing resistance.

Response:

For pile driving with open ended diesel hammers, an instrument such as the saximeter is required. The instrument should show whether the stroke of each blow is sufficient to be counted. This historic language is mirrored in Specification 455. This SP is intended to only make changes specific to Design-Build type projects. No change made.

- 6) 455-5.10.7:

- a) How is the requirement of resistance at $EOID \geq 1.1$ Factored Design Load to be interpreted for non-instrumented piles? Does the driving criteria have to include a blow count for this requirement?

Response:

The driving criteria (stroke vs. blow count) needs to be established and met or exceeded at the end of initial driving. Change made.

- b) Since the instrumented piles would most likely be the test piles which are usually driven deeper than production piles, it may be unreasonable to require non-set-checked production piles to be driven deeper. Should this requirement be changed to indicate the piles must be driven the full production pile length with EOID resistance \geq instrumented pile EOID resistance?

Response:

This is a reasonable approach, however, additional length may be needed to keep instruments above water and accessible. No change made.

- c) The note stipulating that the time is from the previous restrrike is an added clarification.

Response:

Disagree; the time vs. % instrumented set checks is from EOID. Change made.

- 7) 455-10.1 - #17 says that a representative shall be available for resolution of issues "within hours notice". How many hours?

Note: This same comment is applicable to 455-15.1.2 #20.

Response:

Change made to within two hours notice in both instances.

- 8) 455-22.1 – Why is the Department picking shafts for CSL before receiving the certification packages? Shouldn't this be up to the GFDEOR at this point, with the Department only looking at the certification and choosing shafts to be verified?

Response:

The GFDEOR is always free to identify shafts for CSL testing. The SCO indicated that identifying shafts at this time based on problems noted during construction would save construction time and costs by resolving issues as soon as possible. No change made.

Rafiq Darji, P.E.
Construction and Materials Engineer
FHWA - Florida Division
545 John Knox Road, Suite 200
Tallahassee, FL 32303
(850) 553-2242
Rafiq.Darji@dot.gov

Comment: (12-20-12) (FHWA)

This is a follow up to our telephone conversation we had yesterday. Thanks for clarifying most of my review comments and I offer the following comments for your consideration.

Specification Section 105:

- Sub-article 105-8.13.7: Revise the sentence in last paragraph to be in consistent with other sub-articles. The word “and” is in the wrong place.

Specification Section 455:

- Sub-article 455-5.19 Verification: Revise “package” to “packages” in the second sentence.

Please revise the proposed specifications accordingly and submit the revised specifications to our office (attn. to Monica) for official approval.

The other comments that we discussed can be looked at further in more details during the next revision cycle.

Response: Changes made. ft