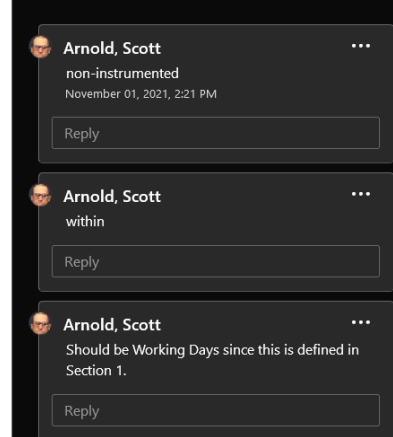


4550511 STRUCTURES FOUNDATIONS  
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Scott Arnold  
(850) 414-4273  
Scott.Arnold@dot.state.fl.us

Comments: (11-1-21, Internal)

For piles on foundations requiring 100% dynamic testing and piles initially non instrumented with instrumented set-checks, the Engineer will accept piles within 2 working days after the final drive is performed, including any instrumented restrikes performed to ensure bearing has been met and that any potential relaxation may not reduce the required capacity below the required nominal bearing resistance (NBR). For foundations not requiring 100 % dynamic testing, the Engineer will accept the production piles within one working day after the final drive is performed, including any restrikes performed to ensure bearing has been met, and that any potential pile relaxation will not reduce pile capacity to less than the required nominal bearing capacity.



SUBARTICLE 455-10.1 is deleted and the following substituted:

**455-10.1 General:** Submit the completed Pile Driving Installation Plan Form (Form No. 700-020-01) with the following information at the preconstruction conference or no later than 30 days before driving the first pile.

1. List and size of proposed equipment including cranes, barges, driving equipment, jetting equipment, compressors, and preformed pile hole equipment. Include manufacturer's data sheets on hammers.
2. Methods to determine hammer energy in the field for determination of

Response:

Changes were made to: "The Engineer will accept piles within two Working Days after the final drive is performed, including any instrumented restrikes performed to ensure bearing has been met and that any potential relaxation will not reduce the required capacity to less than the required nominal bearing resistance (NBR)".

Ananth Prasad  
(850) 566-9655  
aprasad@ftba.com

Comments: (11-2-21, Internal)

Why 2 wd for 100% dynamic testing and 1 wd for piles not dynamically tested?

For piles on foundations requiring 100% dynamic testing and piles initially non instrumented with instrumented set-checks, the Engineer will accept piles withing 2 working days after the final drive is performed, including any instrumented restrikes performed to ensure bearing has been met and that any potential relaxation may not reduce the required capacity below the required nominal bearing resistance (NBR). For foundations not requiring 100 % dynamic testing, the Engineer will accept the production piles within one working day after the final drive is performed, including any restrikes performed to ensure bearing has been met, and that any potential pile relaxation will not reduce pile capacity to less than the required nominal bearing capacity.

Response: Change made to include 2 working days for both cases. See above answer.

\*\*\*\*\*

FDOT District 3  
Matt Webb: [Matt.Webb@dot.state.fl.us](mailto:Matt.Webb@dot.state.fl.us)  
Heath Riley: [Heath.Riley@dot.state.fl.us](mailto:Heath.Riley@dot.state.fl.us)  
Philip Gainer: [Phillip.Gainer@dot.state.fl.us](mailto:Phillip.Gainer@dot.state.fl.us)  
Jason Peters: [Jason.Peters@dot.state.fl.us](mailto:Jason.Peters@dot.state.fl.us)

Comments: (11-3-21, Industry)

#### **455-10.1 General- (4550511 Standard Spec.)**

1. New language added (4550511) to Item 8. Concerning the Pile Installation Plan, “8. *Proposed plan for monitoring settlements and vibrations of adjacent structures, identifying the proposed equipment, the structures and the specific points that will be monitored.*” This language should also be similarly added to the SP455000DB specification 455-10.1.

Response: This change is not necessary to the DB spec because the DBRFP requires a SVMP. No change made.

#### **455-15.1.2 Drill Shaft Installation Plan (DSIP)- (4550511 Standard Spec.)**

1. New language added (4550511) to Item 18. Concerning the Drilled Shaft Installation Plan, “18. *When settlement and vibration monitoring of adjacent structures are required as per 108-2, submit a proposed monitoring plan identifying the proposed equipment, the structures and the specific points that will be monitored.*” This language should also be similarly added to the SP455000DB specification 455-15.1.2.

Response: This change is not necessary to the DB spec because the DB RFP requires a SVMP. No change made.

2. New language added (4550511) to Item 20. Concerning the Drilled Shaft Installation Plan, “20. *Other information shown in the Plans or requested by the Engineer.*” This language should also be similarly added to the SP455000DB specification 455-15.1.2.

Response: Agree. Change will be made to the DB spec.

#### **455-47 Auger Cast Pile Installation Plan (ACPIP)- (4550511 Standard Spec.)**

3. New language added (4550511) to Item 8. Concerning the Drilled Shaft Installation Plan, “8. *Proposed plan for monitoring settlements of adjacent structures, identifying the proposed equipment, the structures and the specific points that will be monitored.*” This language should also be similarly added to the SP455000DB specification 455-47.

Response: This change is not necessary to the DB spec because the DB RFP requires a SVMP. No change made.

#### **455-15.8.3 Polymer Slurry: (Both 4550511 & SP4550000DB Specs)**

4. The viscosity range of polymer on miscellaneous structure foundation states, “50 seconds to upper limit recommended by the manufacture.” This should be amended to, “50 seconds to upper limit recommended by the manufacturer **based on soil type.**”

a. Manufacturer’s instructions can publish an overall range limit for their product and a reduced set of ranges based of soil or formation type of excavation materials. This change should avoid any confusion with using the wrong viscosity ranges and cause the user to seek the appropriate ranges based on soil type.

5. The wording in this same area should be manufacturerer, instead of manufacture.

Response: Agree. Changes made.

#### **455-15.8.4 Fluid in Excavation At Time Of Concrete Placement: (Both 4550511 & SP4550000DB Specs)**

6. The additional table for Mixed Polymer Slurry Properties located within this section, seems to be contradictory to the table in shown in 455-15.8.3 concerning the ranges of viscosities on the miscellaneous structure foundations and the specification language.
- a. It has been accepted to date that this paragraph is dealing with the testing of polymer slurry, “... *in the shaft prior to placing the concrete,*” 455-15.8.4. Moreover, the polymer testing requirement of this specification is documented on the construction form 700-010-84 on the Fluid-Slurry sheet under section b) titled, “*Before placing concrete.*” Within these premises, the first paragraph of the specification states, “*When any fluid is present in any drilled shaft excavation, including shafts to support sign, signal, lighting and ITS structures, the applicable test methods and reporting requirements described in 455-15.8.1, 455-15.8.2 and 455-15.8.3 apply to tests of fluid in the shaft prior to placing the concrete.*” The last portion of this specification sentence directs the user to apply the testing ranges listed in section 455-15.8.3. Following this direction back to the last section, the polymer slurry is shown to have a viscosity range of 50 seconds to upper limit recommended by the manufacturer for miscellaneous structure foundations. Whereas, below the opening paragraph in the 455-15.8.4, the user is directed with the following language, “*When polymer slurries are used ensure the properties of the polymer slurry are within the following acceptable ranges at the time of concrete placement.*” The following range for polymer slurry is now listed as 50 seconds to the upper limit defined by APL, which is assumed to apply to all shaft types and is now contradictory to the table in 455-15.8.3: concerning polymer viscosity for miscellaneous structure foundations.  
**This contradictory question caused the formation of the question below.**

**Response:** The intent of this change is to assist the LESS contractors to stabilize the excavation particularly if they need to stop operations overnight, by allowing them to have slurry with viscosities (during excavation only) up to the values recommended by the manufacturer. In 455-15.8.3 we are talking about the time during the initial mixing and the excavation operations. Table 455-3 will apply. No Change made.

7. Is there a difference in the interpretation of the language of polymer testing in a shaft, “At time of concrete placement,” verses, “prior to placing the concrete,” concerning the utilization of the additional table for polymer slurry testing properties in 455-15.8.4?

**Response:** No. In subarticle 455-15.8.4 we are talking about the time after the shaft excavation has been completed and accepted and just prior to place concrete. The fluid tests performed here are the last tests performed just before they place concrete. Table 455-4 will apply. Viscosity values will be limited up to the values they will be approved in the APL which will be based on the testing reports the manufacturer has submitted, to avoid any issues with the concrete-rebar bond and concrete-soil bond. These values are equal or lower than the viscosity recommended by the manufacturer. No Change made.

#### **455-16.3 Support, Alignment, and Tolerance- (Both 4550511 & SP4550000DB Specs)**

8. New language, “...*Provide spacers within 3 feet of the bottom and at intervals not exceeding 10 feet along the reinforcement, with a minimum of two levels of spacers below the bottom of the casing,*” has removed the language to provide spacers **within 6 feet of the top**.

- a. Recommend adding this language back into language concerning shafts which support sign, signal, lighting, and ITS structures.

1. Since the new language requires a minimum of two levels of spacers below the bottom of the casing and a third row placed anywhere within the surface casing, adding back the language to provide spacers within 6 foot of the top will promote a means to keep the spacers more evenly spaced when longer than 6 foot surface casings are used. With no requirement/guidance of the spacer row placement within a longer casing, a potential to adversely affect the cage centering exists. The image below depicts a longer 8 foot casing employed on a typical 12 long miscellaneous shaft. Note: In our district, we have used 10 and 12 foot long surface casing on longer shafts to mitigate caving layers. The image demonstrates how the omission of language could cause an excessive length of unsupported cage on just an 8 foot surface casing. How far could a contractor possibly stretch this unsupported/centered cage length on a 10 or 12 foot surface casing used on a 16 foot shaft length? This could be as long as 10 feet, according to the language, “*at intervals not exceeding 10 feet along the reinforcement,*” used in conjunction with no requirement to place spacers within 6 feet of the top.

*Response: The new language applies to miscellaneous structures when an oversized casing is used (which is what typically the LESS contractors do). This spec change was the result of a request by the LESS contractors. Your drawing does not reflect accurately the typical conditions in construction. You may want to visualize the situation by drawing a casing 12” larger than the diameter of the excavation below the casing, for example, and considering that the larger plastic wheels available in the market are 5.38” radius (not even 5.5”). You will end up with spacers that tend to lean towards one side of the upper casing because there will be 9” to 12” distance between the cage and the casing and the spacer is only 5.38” radius (with an annular gap of 3.38” to 6.62”). When the cage leans towards one side of the casing the steel is not parallel to the excavation and the cover will be reduced dramatically in the portion of the shaft below the casing. When the cage leans towards one side of the casing the steel is not parallel to the excavation anymore and the cover will be reduced dramatically in the section below the casing. Therefore, the upper spacer in this condition is not useful to keep the cage concentric and instead, it may be in the way of many elements (rebar, bolts, etc) and conduits that may be in this type of shafts. In the past the Districts tried to require contractors to use a special type of combined spacers to ensure concentric 9” to 12” cover in the upper casing but this was not a practical method and did not allow the contractors flexibility in the size of casing they could use. The change includes a performance type language in which the contractor will have the flexibility to come up with their own means, devices, and methods to ensure the cage is concentric with the shaft and the upright. Having a minimum of two level of spacers should assist in keeping the cage aligned, even if, like in your example, the spacing is only 4 ft. The contractor still can and should add additional devices in the upper part of the shaft (templates, steel sections, braces, etc) to ensure the concentricity of the shaft.*

No Change made.

Specification writing discontinuity has the potential to cause confusion when compared to established writing rules seen on previous special instruction paragraphs concerning shafts which support sign, signal, lighting, and ITS structures.

The second paragraph starts off by stating requirements for all shafts, but then goes on to state new requirements within the same paragraph for shafts which support Sign, Signal, Lighting, and ITS Structures. This is not following the established writing protocols within the same specification 455 section. For example (July 2021 specs) in section-15.1.3 General methods & Equipment: the fourth paragraph actual starts a new paragraph concerning special details/instructions for shafts which support sign, signal, lighting, and ITS structures. Also, within 455-15.11.4.1 (Exceptions for Shafts for Sign, Signal, Lighting, and ITS Structures) and 455-16.2 (Splicing Cage) special instructions are detailed with a new paragraph for the same type of miscellaneous shafts. Consider following this established writing protocols for subsequent paragraphs within the 455-15 sections to assist with interpretation and clarification.

**Response: Change made. The new text will be included in a separate paragraph.**

\*\*\*\*\*