4550000 STRUCTURES FOUNDATIONS
COMMENTS FROM 2nd INDUSTRY REVIEW (3/25 –26/2008)

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David A. Sadler, P.E.
State Construction Engineer
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Comments:

Thanks for the comments Bob.

Larry Jones has been responding to the comments from the reviewers and I think his responses will address many of the comments below. Recognizing that this was a rush effort to meet the Spec processing deadlines, there will be subsequent changes in the next spec cycle and those will have industry opportunities from input.

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JC Miseroy
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Comments:
I would also like to state that it was refreshing to have Robert, Dave and Larry open to listening to our issues with the 455 specification and to have made quite a number of changes we had asked for. We would certainly like to thank them for their time and efforts in working with FTBA on this matter.

In addition to what Keith has listed below I have the following comments.

455-5.1.1 - The first sentence states that pre-formed holes are 4 foot, which seems to be in conflict with changes made to 10 feet or 20% on the next page.

455-5.3.2 - Pile Cushions. As Keith stated, FDOT has not addressed driving criteria that provide for cushion replacement after a number of hammer blows. I will be sending Larry some examples of driving criteria that include this restriction, and ask that others do this also.
455-5.10 - Bearing Requirements. The specification still does not provide guidance on how to handle piles with rebound > 1/4". Personally I think the 1/4" is too low, especially with long piles. It would be helpful if the specification included direction on ways to handle piles with rebound > 1/4", other than just to keep driving these piles.

455-7.7.3 - Precast Reinforced Build-Ups. This sub-article still states that the build up should be constructed using the same form materials and the same mix design used for casting the pile originally. This is typically not possible.

455-8.7 - Coating (of steel piles). I still feel this work should be defined in the plans.

455-11.2.7 - Replacing Piles. FDOT has added that the extraction of piles will be paid at 30 feet of piling. See comment on 455-11.10 below.

455-11.6 - Steel Sheet Piling. FDOT has not addressed issues with the payment of (temporary) sheet piles. Often changes are made by the contractor (as allowed by the plans and specifications) in the design of these walls. This redesign might be for a different type of wall or a wall with reduced area and it is very difficult to determine how we will be paid. Typically FDOT wants to pay the reduced area, but not any increase in area. We had proposed payment by the linear feet of wall, but this does not address all issues. We need a specification that provides payment to the contractor for the amount bid for wall shown in the plans, even if the contractor's wall design has less area. The amount would be adjusted for plan errors or wall area added beyond what was shown in the plans. I also agree with Keith that walls with tie backs should be priced separately or the anchors should be paid under separate bid items as was the case previously. Having one bid item for both types of wall makes it impossible to compare pricing to District wide averages.

455-11.10 - This sub-article states that pile extracted as authorized by the Engineer will be paid as unforeseeable work. This seems to be in conflict with 455-11.2.7. I like the idea of force account for this work, since it would be impossible to figure out what this will cost ahead of time.

455-12.6.1 - Permanent Sheet Piling. This sub-article states that payment includes preformed holes. Sub-article 455-9.3.1 states that when the existence of rock or strong material is not indicated on the plans, drilling will be paid as unforeseeable work. It would be good if this sub-article references 455-9.3.1.

455-12.9 - Preformed Holes. I would still like to consider excluding casing from the last sentence of this sub-article. 455-5.9.4 discusses the construction of pre-formed holes by drilling, using a suitable punch or chisel. If the hole will not stay open using these methods and a casing is required, this should be paid as unforeseeable work.

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Keith Waugh
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UserTel: 352-787-1616, UserFAX: 352-787-3161

Comments:

1. Delete all reference to Static Load Tests and include this work as a TSP on a project by project basis.

2. In 455-5.1.1 20% is good but I'd like to see 25%.

3. In 455-5.3.1 the word "cushion" needs to be added after capblock and before "constructed of durable" in second sentence.

4. In 455-5.3.2 payment for additional pads was not addressed.

5. In 455-5.12.1 regarding water jets, replace "allowed" with "required".

6. In 455-5.14.2 overruns and underruns in excess of 10 or 15% need to be addressed.

7. In 455-5.15.5 replace "Unforseeable Work" with "all additional work". Generally in Specs, "Unforseeable Work" has a tag with extra work/extra compensation/changed condition.

8. In 455-12.6.1 I believe that temporary soil anchors should be paid on a per each basis.

It was good to see that time frames were addressed. I know some Contractor's want higher multipliers for certain items (splices, redrives, etc). Although we did not provide the Department with any backup documentation, we all know that costs have risen tremendously since Previous agreement. Even tho unit prices have risen, the old multipliers don't adequately cover the extra costs.

Other than the above, I'm pretty pleased.

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4550000 STRUCTURES FOUNDATIONS
COMMENTS FROM INDUSTRY REVIEW

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John Previte
D1 Specifications Engineer

Comments:

Last sentence of 455-5.9
[Fill all voids between the pile and soil remaining after driving through preformed holes with concrete sand or clean sand *after the pile has achieved the required minimum tip elevation and before driving ceases, unless grouting of preformed pile holes is shown in the plans*.]

Improve flow and understanding of this sentence as follows:

[*After the pile has achieved the required minimum tip elevation and before driving* through preformed holes *ceases,* fill all voids remaining ~~voids~~ between the pile and soil ~~remaining after driving through preformed holes~~ with concrete sand or clean sand *unless grouting of preformed pile holes is shown in the plans*.]

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455-5.9.3 Conditions Under Which Payment Will Be Made: The Department will make payment for Preformed Pile Holes *shown in the plans, required by the Engineer and* where the Contractor demonstrates that such work is necessary to achieve the required

penetration of the pile.

District One had issue with this; would like it to be abundantly clear whether there are one, two or three conditions to be met to justify payment.

Either: The Department will make payment for Preformed Pile Holes *shown in the plans, and required by the Engineer and* where the Contractor demonstrates…

Or: The Department will make payment for Preformed Pile Holes *either shown in the plans, or required by the Engineer and* where the Contractor demonstrates…

Or: The Department will make payment for Preformed Pile Holes *either shown in the plans, or required by the Engineer or ~~and~~* where the Contractor demonstrates…

Etc, there are more possibilities…

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455-17.6.1.5 Coring and/or Repair of Drilled Shafts: [If the Engineer determines a drilled shaft is unacceptable based on the CSL tests and tomographic analyses, *or problems observed during drilled shaft construction,* **]**

Either: [If the Engineer determines a drilled shaft is unacceptable based on the CSL tests and tomographic analyses, *or problems are observed during drilled shaft construction,* **]**

Or: [If the Engineer determines a drilled shaft is unacceptable based on the CSL tests and tomographic analyses, *or observes problems ~~observed~~ during drilled shaft construction,* **]**

Response:

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Mike Bone
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Comments:

Ref. 455-5.9.1 - I recommend weighing the need to place sand in the whole during driving against the safety hazzard of requiring additional work under the hammer while it is running. Concrete piles may spall at the top during driving. The only person under the hammer should be the foreman as he occasionaly places a level on the pile.

Response:

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Keith Waugh

kwaugh@lewarecc.com
UserTel: 352-787-1616, UserFAX: 352-787-3161

Comments:

455-5.3.2 Pile Cushion: Most driving criteria specifies changes pads after a maximum hammer blows regardless of condition. How will payment be addressed for the costs associated with stopping driving operations to change pads?

455-5.14.3 Authorized Pile Lengths: Lengths should be set after driving of individula test piles or all test piles within a specified distance, not after "all". Second paragraph gives direction for authorizing lengths within seven days if the Contractor is willing to start "in phases designated by the Engineer". This needs to be revised so that the Contractor makes a request based on his planned sequence and his schedule to expedite the project.

455-7.8 Pre-Planned Splices: Will dyanmic test loads also be required for the driving of a drivable splice that is not preplanned? Further, will an epoxy doweled non-driveable splice be tested for integrity? If so, the non-driveable build-up must be tested using methods that do not require pile driving equipment. The Pile Integrity Test (PIT) can be performed by the Engineer without the Contractor supplying heavy equipment.

455-11.5 Dynamic Load Tests: Will payment be made as 15' of Test Pile for test piling and 15' of regular Pile for production piling?

455-11.9 Pile Splices: Since the Department authorizes the lengths, then the Department should pay for splices that are required to furnish piling in excess of the lengths shown as on Index 20600 for maximum lengths with a three-point pickup.

455-12.6.2 Temporary Sheet Piling: Payment should be the same basis as for Permanent Sheet Piles as stated in 455-12.6.1. Anchors, etc., both permanent and temporary, are installed in accordance with Section 451 and therefore payment should be allowed on a unit price basis for each as stated in 451-12, regardless of the condition.

Response:

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Juan F. Castellanos, PE
District 4-6 Geotechnical Engineer
Ph: 954 677 7011

Comments:

Section 455-5.10.4, item c): Add the following (in italics blue) at the end of paragraph: “Instrumented set-checks…..exceeds 95% of the required pile resistance*, and the static capacity observed in subsequent blows is at least 90% of the required pile resistance*. “

Section 455-11.5 Second paragraph last sentence: Add the following (in italics blue) "No payment will be made for dynamic load testing to evaluate the integrity of an epoxy-bonded dowel splice, *for pre-planned splices*."

Section 455-11.5 Last paragraph, last sentence. To include set-checks and re-drives of piles that have not been previously instrumented add the following sentence: *In the event the Engineer requires an instrumented re-drive or set-check of a pile not instrumented previously, it will be paid at 8 feet of additional driving.*

Section 455-16.3 Last sentence: "Use concrete spacers…." The word *concrete* here seems redundant and unnecessary.

Response:

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Bob dion
bob_dion@urscorp.com
UserTel: 386 740-0665

Comments:

You have included the Basis of Payment for Dynamic Test Loads in the Method of Measurement, 455-11.5. Suggest moving 'Payment for Dynamic Load Tests will consist of 15 feet of additional piling' and 'In the event the Engineer requires an instrumented redrive of a pile previously instrumented more than 72 hours after initial driving, it will be paid for as 8 feet of additional piling from 455-11.5 to 455-12.5.'

Since your intent is to delete the pay item for Dynamic tests suggest you Reword 455-12.5 to:

455-12.5 Dynamic Test Loads: There will be no separate pay item for Dynamic Load Tests. Payment for Dynamic Load Tests will consist of 15 feet of additional piling. In the event the Engineer requires an instrumented redrive of a pile previously instrumented more than 72 hours after initial driving, it will be paid for as 8 feet of additional piling. Price and payment will be full compensation for all labor, equipment, and materials required to assist the engineer in performing this work.

Response:

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Comments:
FYI
In looking at the industry review spec for section 455, noticed that the present special provision for embedded data collectors, sp4550512, will need to be modified when this is added to a workbook.
The industry review spec deletes item 455-137, the special provision includes it. Suggest you delete this item from the payment items in the special provision.
Also, a subarticle, 455-12.8, was added to the industry review spec for Fiberglass Structurally Reinforced Composite Piles: This will require the renumbering 455-12.14 in the special provision to 455-12.15

(from sp4550512)
SUBARTICLE 455-12.~~14~~ 15(of the Supplemental Specifications) is deleted and the following substituted:
455-12.145 Embedded Data Collector: Price and payment will be full compensation for furnishing and installing the Embedded Data Collector.
455-12.1~~5~~6 Payment Items: Payment will be made under:
Item No. 455- 2- Treated Timber Piling - per foot.
Item No. 455- 14- Concrete Sheet Piling - per foot.
Item No. 455- 18- Protection of Existing Structures - lump sum.
Item No. 455- 34- Prestressed Concrete Piling - per foot.
Item No. 455- 35- Steel Piling - per foot.
Item No. 455-119- Test Loads- each.
Item No. 455-120- Point Protection - each.
Item No. 455-133- Steel Sheet Piling - per square foot.
~~Item No. 455-137- Dynamic Load Tests - each.~~
Item No. 455-143- Test Piles (Prestressed Concrete) - per foot.
Item No. 455-144- Test Piles (Steel) - per foot.
Item No. 455-145- Test Piles (Concrete Cylinder) - per foot.

(from ss455000)
455-12.14 Prestressed Concrete Pile Cut-Off: There will be no separate pay item for pile cut-off. ~~Payment for each cut-off will be made as 5 feet of additional piling furnished.~~ *Anticipate all piles will require cutting-off, and include all costs associated with pile cut-off in Pay Item 455-34.*
455-12.15 Payment Items: Payment will be made under:
Item No. 455- 2- Treated Timber Piling - per foot.
Item No. 455- 14- Concrete Sheet Piling - per foot.
Item No. 455- 18- Protection of Existing Structures - lump sum.
Item No. 455- 34- Prestressed Concrete Piling - per foot.
Item No. 455- 35- Steel Piling - per foot.
Item No. 455- 37- Fiberglass Structurally Reinforced Composite Piles-per foot.

Item No. 455-119- Test Loads- each.
Item No. 455-120- Point Protection - each.
Item No. 455-133- Steel Sheet Piling - per square foot.
~~Item No. 455-137- Dynamic Load Tests - each.~~
Item No. 455-143- Test Piles (Prestressed Concrete) - per foot.
Item No. 455-144- Test Piles (Steel) - per foot.

Response:

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Greg Weich
District 1 & 7 Materials Precast / Special Materials Coordinator
Tampa Branch Materials Office
2922 Leslie Road, Tampa, Florida, 33619
Office# 813-744-6070, Fax# 813-744-6069, Cell # 813-545-6786
gregory.weich@dot.state.fl.us

Comments:

Good afternoon Duane, the only comment I offer is that under 455-4 Classification, at the bottom of the list shown, that a statement is made as follows; " Obtain Precast / Prestress Pile products from a plant that is currently on the Department's list of qualified Precast / Prestress Concrete plants." This statement is currently used in several other Specifications and the Materials Manual for off site fabricated products.

Response:

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From: Nolan, Steve
Sent: Friday, December 28, 2007 8:45 AM
To: Jones, Larry
Cc: Pavlov, Andre; Shaw, Clinton
Subject: Drilled Shaft specification 455-16.3

Comments:

Please see the following request to review Specification Section 455-16.3 from District 1 Structures:

" We also suggest that Subsection 455-16.3 of the Standard Specifications be looked at again; it appears that reference to subsection 455-8 is in correct. We think it should be 455-20."

Regards,

Steven Nolan, P.E.
Structures Design Engineer

FDOT Structures Design Office
605 Suwannee Street MS-33
Tallahassee, FL 32399-0450
(850)414-4272, FAX (850)414-4955
Email: steven.nolan@dot.state.fl.us

From: Moliere, Gerard
Sent: Friday, December 21, 2007 11:55 AM
To: Nolan, Steve
Cc: Powell, Jr., Rudy; Andres, Tom; Pavlov, Andre; Robertson, Robert
Subject: Concrete Cover for Drilled Shafts

Steve,
The 2008 Design Standards specify concrete cover for drilled shaft in various ways. For instance,
1. Index 11310 sheet 2 of 5 shows 6" (Typ.)
2. Index 11320 sheet 5 of 5 shows 6" (Typ.)
3. Index 17502 sheet 5 of 7 shows 6" clear
4. Index 17723 sheet 2 of 3 shows 6" (minimum)
5. Index 17745 Sheet 2 of 5 shows 6" with a note ' 6" minimum cover on shaft reinforcement'

We would like to suggest that the concrete cover for drilled shafts be specified the same way in all related standard indices, and we prefer " 6" typ." or " 6" clear" instead of "6" minimum" since subsection 455-20 specifies the tolerances.
We also suggest that Subsection 455-16.3 of the Standard Specifications be looked at again; it appears that reference to subsection 455-8 is in correct. We think it should be 455-20.

District One Structures extends its gratitude to you all for the support you provided throughout 2007, and wishes you peace and all the joys of the holiday seasons and a happy new year.

Gerard Moliere, PE
District Structures Design Engineer
Florida Department of Transportation
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Response:

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Jesse Ortiz, P.E., Structures Design Engineer P: 813.975.6049
e: jesse.ortiz@dot.state.fl.us

Comments:

As requested, we reviewed the subject specifications and although no discrepancies were detected in the proposed revisions, please see below for minor comments/suggestions we have on section 455. Thanks.

Section 455 (Revised 12-27-07) - Review Comments from D7 Structures Design			
No.	**Sect #**	**Comment**	**Response**
1	455-5.7	Suggest remove the word “[meters]” following “feet” in the second sentence of the second paragraph in section 455-5.7 for consistency with other locations in section 455 where “feet” is shown without “[meters]”.	
2	455-10.8 & 11.2(a)	Suggest remove the text “(20 blows per inch)” following “practical refusal” in the first sentence of the third paragraph in section 455-10.8, and in the first sentence of the third paragraph in section 455-11.2(a). The reason for this is that “practical refusal” is previously defined in section 455-10.3.	
3	455-45	Replace the word “plum” with “plumb” in the last sentence of section 455-45 for correctness.	
4	455-15	Consider adding text to state that in the case of miscellaneous structures like mast arms and overhead sign structures, the drilled shaft will be paid for using the pay items for Class IV Concrete (Drilled Shaft) and for Reinforcing Steel.	
5	455-43	The term “LOT” as used in section 455-43 appears to be undefined in section 455. Should a reference to section 346-9.3 be added for the definition of this tern for clarity?	
6	455-12.15	Shouldn’t the pay item 455-36- for CONCRETE CYLINDER PILES be shown in subsection 12.15 also? A separate pay item is currently shown for “Test Piles (Concrete Cylinder)”, but not for the concrete cylinder pile itself.	

Response:

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Paul Passe
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Comments:

Under 455-5.10.4 c where it states 1 blow shall exceed RDR and the next 5 shall exceed 95% of RDR, I would recommend changing "next" to "other" for the highest capacity may not be the first blow.

Response:

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Jose Rodriguez
jsrodriguez@pbsj.com
813-281-8221

Comments:

1) 455-8.3: Verify whether the new AWS reference should be D1.5 (see 455-8.4).
2) 455-11.5: It appears the beginning of the first sentence should be modified, since payment will no longer be made by the number of dynamic load tests.

Response:

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Tom Casey
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Comments:

Curious if there has been any studies with the marl (Jacksonville area) for time dependent capacity gain with driven piles. Specifically if the 72 hour re-drive is sufficient time wise to determine, or take advantage of this phenomenon. Our experience with the Cooper Marl formation in the Greater Charleston area is that setup can be significant and quite a bit of economy can be added to projects when you design or plan to take advantage of this.

Response:

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Daniel F. Haldi
daniel.haldi@dot.state.fl.us
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Contact_Requested

Comments:

9.2 Concrete with Air Entrainment ? Suggests there can be non-air entrained concrete, whereas all 346 concrete is air entrained ! So just say concrete ... remove air entrained.

17.2 Elapsed time should include time inclusive of bolt installation and finishing since concrete needs to be fluid to permit ease of enbedment and bond and waterless durable smooth finishing.

17.6.1 CSL minimum number of tests is not always in the plans, so should state at engineer's descetion as deemed necessary.

40-(6) Fluidizer is not consistent terminology as in ASTM C 937 or 455-42(2)

Response:

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Christopher Wood

D2 Construction, Contract Support Specialist
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195*106*55925-Direct Connect
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Comments:

Here are some comments I have received from District 2 personnel on this specification:

1. It seems they have cut off some of the pay items in 455-12.15, page 35 of this proposal. There are no costs shown for prestressed concrete pile or test piles, etc.

2. In 455-15.9, the section relating to tremies is incorrect. Section 400-8 is for Seal concrete and that is where they talk about tremies. Need to move 400-8.3 out of 400-8.3 and make it stand alone, or include this under the 455 spec.

3. In 455-17.3, need to modify this so that it reads metal or wood forms to be specific as to the type of forms to be used for the top of the drilled shaft. Need to eliminate the use of sonotube as this material is not suited for the top of drilled shafts. Using the word "sturdy" is misleading to a contractor.

4. In 455-17.6, they have eliminated a lot of text for this section. Also, they have eliminated 455-17.6.1.1

5. Need to include additional payment items in 455-24.13 and additional text for spread footings.

6. I recommend that someone read through this specification to verify that all the sections are included since this has occurred in my item 1, 4 and 5 above.

7. It does not seem practical to fill the space between the pile and the preform hole prior to completing driving.

8. I suggest we go back to the old way of driving piles and use the ENR formula.

Response:

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JC Miseroy
Granite Construction Company
1-14-2008

Comments:

455-5.3.2 Pile Cushions.

What happened to including a payment for additional pile cushions when the driving criteria require replacement of pile cushions before the conditions described in the 10th sentence of the first paragraph of this section? Many criteria now require replacement of pile cushions after a specific number of hammer blows, rather than because the cushion has compressed more than one half of the original thickness or caught on fire. There had been discussions about paying for additional cushions as X feet of pile. It is impossible to determine at bid time that more than one pile cushion per pile will be required because the pile is being overstressed.

455-5.10.2 Blow Count Criteria & 455-5.10.3 Practical Refusal.
These Specifications need more direction on what to do when rebound exceeds ¼".

455-5.10.4 (c) Instrumented Set Checks and Instrumented Pile Re-Drive.
The final sentence includes the language 'The Engineer may consider the pile to have sufficient bearing resistance ..'. This leaves the Contractor totally at the mercy of the Engineer. This is another example of how the 455 specification grants so much latitude to the Engineer that a DRB can never rule against FDOT for any pile related issues.
Will a pile be accepted if it meets the criteria stated in this sub-article, even if the blow count is falling?

455-7.8 Pre-Planned Splices.
This section requires that when the contractor elects to use dowel splices, a dynamic load test is required to verify the integrity of each splice.
Section 455-11.5 (Dynamic load tests) states that no payment will be made for dynamic load tests used to evaluate the integrity of an epoxy-bonded splice. What about un-planned splices? Epoxy-bonded splices may be the only option, and it is not reasonable that there would be no payment made for PDA testing in this instance.

455-8.3 Pile Splices.
There is a reference in the last paragraph of this section to API 5L. What is API? Is it part of the Contract?

455-11.5 Dynamic Load Tests.
This sub-article states that payment for dynamic load tests will consist of 15 feet of additional piling. Do we use unit pricing for test piles when performing dynamic load tests on test piles?
This sub-article states that there will be no payment for dynamic load tests used to evaluate the Contractor's driving equipment. Does this mean that the PDA on the first test pile is not paid for?
In the case of an instrumented re-drive of a pile previously instrumented, more than 72 hours after initial driving, will the Contractor be paid the 20 feet for the re-drive as described in 455-11.10 plus the 8 feet for the PDA as described in this sub-article? It makes sense that an instrumented re-drive would be more expensive. Do we use test pile unit prices for re-drive on test piles?

Response:

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Max Holmes
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mholmes@geotech.us

Comments:

I have gone through the 4550000 document and inserted notes on recommended changes. My notes were made in Adobe Acrobat, and are in the margins with a note icon in the text. These comments or notes should show up on screen when the document is reviewed. For printing, the "Print What" button should say "print documents and comments" in order to see the comments.

These comments are added here:

455-1.2: If slurry-drilled piles are expected, and the ground water is within about 15 feet of the surface, the pile foundation surface area should not be excavated or taken down unless the ground water table will be at least 6 to 10 feet below the new, lower ground surface of the foundation area. If the area is excavated such that the water table is less than 6 to 10 feet below the new surface, it may be impossible to maintain sufficient slurry column height above the water table to maintain hole stability. This is especially critical if drilled shaft piles will be more than about 60 feet deep, or if shaft diameters are 36 inches or less and if massive kelly bars (European-type rigs) are used. Steel displacement can cause slurry levels in small holes to fluctuate greatly.

455-15.8.1: Need to cite a specification for attapulgite and bentonite, to assure that quality materials are used. In the absence of a specification, contractor can use anything that is labeled "attapulgite" or "bentonite", which can be any pulverized mineral from any supplier or source. A mixture of guar gum and pulverized limestone would look like bentonite, and might fool an inspector for a short while. it might also be relatively inexpensive. API Specification 13A contains specifications for various grades of bentonite and attapulgite. These standards should be studied to determine what grades of these processed clay minerals are acceptable to FDOT. Last sentence – replace "professional soil testing laboratory" with "drilling fluids engineer or technician".

In the table for mineral slurry, the viscosity of water is 26+/- 0.5 second. Allowing a 28 second slurry is allowing water. We suggest 35 minutes. Replace Test Method "Marsh Cone Method" with "API Marsh Funnel Method".

455-15.8.1 – Second sentence should be as follows: Use polymer slurry only if ~~the soils are not classified as organic, and~~ the pH of the fluid in the hole can be maintained in the alkaline range and in accordance with the manufacturer's recommendations.

455-15-8.2 – Second paragraph, 1st sentence - Take samples of the fluid in the shaft from *within 2 feet of shaft bottom and at midpoint of shaft* ~~the base of the shaft and at intervals not exceeding 10 feet up the shaft~~ using an approved sampling tool.

As for recommendations as to what proofs should be required for polymers to added to the QPL, we suggest the following:

1. Independent lab tests to show no significant deleterious effects of polymer slurry on:

a. concrete-to-rebar bonding (pull-out tests)
b. concrete contamination when 10% of concrete mix water is replaced with polymer slurry
c. Concrete curing when immersed in polymer slurry
NOTE: All candidate slurries should contain the products, concentrations (slurry formulations) and properties (such as viscosity for which the slurry supplier is seeking QPL approval).

2. Independent lab evidence to show that the formulated slurry is non-toxic or of very low toxicity so as to facilitate disposal and to avoid contamination of Florida's natural environment. Also recommended disposal methods and treatments to facilitate acceptable disposal.

3. Data from 3 field load tests that show acceptable effects of the candidate polymer slurry on frictional load bearing, shaft geometry and integrity. These load tests must be constructed using a range of slurry viscosities and formulations for which the supplier seeks QPL approval.

I have attached to this email some documents that bear on what we have recommended, and that you may find useful. Please note that the attached documents are for the use of Florida DOT only, and are not to be copied or circulated outside the circle of people involved with this project. All the docs are copyrighted and are the sole property of Geo-Tech Services, LLC.

Response:

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Joe Blasewitz
Project Administrator
PB Americas, Inc.

Comments:

I have reviewed the re-write of 455 and have the following comments/suggestions:

- 455-5.9.1 Preformed Pile Holes - Description - in the added language of paragraph 2 we suggest changing the phrase **"before driving ceases"** to ***"before driving is completed"***. Filling the void before driving ceases implies that the work is to be done while the hammer is running overhead. This *may* be a concern for the worker to be in close proximity to the pile during active driving. Stating it as before driving is completed allows the work to be done at any time determined by the Contractor and not while the hammer is running.
- 455-5.12.1 Test Piles - Description - in the 6th paragraph we suggest adding the phrase ***"up to"*** before the phrase **"60 minutes".** This allows for flexibility on the Geotech's part.
- 455-23.3 Method of Measurement - Unclassified Shaft Excavation - in the first sentence after the phrase **"ground surface elevation"** we suggest adding the phrase ***"after any required excavation per 455-1.2"*** to further clarify the pay limits of the item.

If you have any questions on these comments/suggestions, let us know.

Response:

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District 3 Comments
Sam Weede, Marshall Hagler, Jared Perdue

Comments:

SAM WEEDE'S REVIEW COMMENTS

- **455-5.10.4 (c) -**
  reads somewhat confusing: suggest…. "set check or redrive will consist of a minimum of six hammer…"

- **455-5.11.2 (c) -**
  For allowable pile tensile stress of mechanically sliced pile: this criteria is under section titled "Wave Equation" and limits stress to 500 psi within 20' of splice. I question the accuracy of this prediction from WEAP analysis.

- **General Recommendation:** "All test piles to be dynamically monitored unless noted otherwise in the plans or by the Engineer. The cost of dynamically monitoring of test piles should be included with the cost of the test piles." This statement needs to be included in the specification. It makes no sense to pay for 15' of pile when all parties know TEST PILES are going to dynamically monitored.

- **455-7.7 -**
  Refer to Marshall Hagler's comments.

- **455-7.8 -**
  Pre-planned Splices: I support the new language requiring a dynamic load test on each dowel spliced pile to verify pile integrity. However, the language reads such that the Department will absorb the cost of this testing. Shouldn't this cost be the responsibility of the contractor? If the splice is unforeseen, then I support the Department being responsible for the dynamic testing but not for Pre-Planned splice.

- **455-11.5 -**
  (2nd paragraph: new language) include "unforeseen" before "epoxy-bound dowel splice"

- **455-15.3 -**
  (2nd paragraph: new language)…. "from at least one foot above ground surface to at least 1 ½ shaft diameters below ground surface"…This statement needs to apply to all Drilled Shaft Construction not just the Wet Construction Method. Also this definitely applies to Drilled Shafts for Miscellaneous Structures.

- **455-15.9 -**
  Include statement "Tremies constructed of PVC are prohibited under wet construction."

MARSHALL HAGLER'S REVIEW COMMENTS

- **455-1.2** - "…not less than 90% of the maximum density as determined by AASHTO T 180…"

  Should be changed to 95% of the Standard Proctor maximum density as determined by AASHTO T 99. Usually at this stage of construction the material has a Standard Proctor but not a modified.

- **455-5.10.4** (c) - last sentence"…blows exceeds 95% of the required pile resistance." For the sake of consistency, should it say "required driving resistance". Whatever the LRFD nomenclature is, we should stay consistent throughout 455 and the SDG.

- **455-5.11.2** (c) (2) – Sapt=500 within 20 feet of mechanical splice
  This is hard to measure.

- **455-5.15.4 -** What does this sentence mean "Do not embed the pile less than 6 inches…"?

- **455-7.1** – "…without the need for a special over length permit." Most all of our trucked piles require permits. Should we put a hard number (e.g. 24" pile – 120' length)

- **455-7.5** - This section needs to be in 450. Cutting the lifting loops back one inch and patching is not covered in 450 and this work is performed at the prestress yards. It is an enforcement issue on occasion. Also, change sentence to "…minimum depth of 1 inch, thoroughly clean, dry and patch…"

- **455-7.7.1** – This section is confusing. Can you use a cutoff less than 21' and use as a drivable splice? The specification seems to contradict the standard index. Look at one common example. We authorize a 25' splice. The pile achieves RDR after 12' of driving. You just cut it off leaving a 13' splice. If this is acceptable, why couldn't you use a 20' cutoff for a splice to start with?

- **455-7.8** - If the contractor uses preplanned dowel splices, he should pay for the PDA.

JARED PERDUE'S REVIEW COMMENTS

- **455-5.10.4** – The spec reads "six blows to 12in or more of driving". This is confusing. Maybe it would be better to read "At least 6 inches" or something of that nature. It may be best for the PDA engineer to determine exactly how many blows are needed to achieve capacity based on the criteria set forth in this section.

- **455-7.8** – Contractor should foot the bill for dynamic monitoring of pre-planned epoxy dowel splices.

- **455-11.5** – The dynamic load testing of test piles should be absorbed in the cost of the test pile. This should also include the monitoring of a redrive for a test pile. Currently if a redrive is performed on a test pile, even though it is still part of the test pile program, the department has to pay for the redrive (20ft of pile) and the dynamic monitoring (8ft of pile) at the test pile price.

- **455-15.3** – Dimensions for temperature surface casing should be applied to both wet and dry construction methods. Currently, the dimensions are only listed in the wet construction method.

- **455-16.3** – There is a grammatical error. The word "maintain" is used twice in the 4th paragraph, 2nd sentence.

Response:

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Comments:

1. 455-7.1 Description: The requirement for driving piles full length without splices needs to be strengthened. The "special over length permit" criteria is too vague. I recommend we specify 100 feet as the minimum full length pile.
2. 455-15.3 Wet Construction Method: The requirement for temporary surface casing should be clarified to require the casing installation before beginning excavation.
3. 455-15.6.2 Cores: Cores below the shaft excavation are not usually needed for Miscellaneous Shafts. An exemption for Miscellaneous Shafts should be added.
4. 455-15.8.1 Slurry: A major revision of this section is needed to clarify when to test the slurry (i.e. before it's in the hole or after it's in the hole) and what tests are required for polymer and mineral slurry in each case. The wording is not clear enough. Maybe doing this with tables would work better.
5. 455-15.8.1 Slurry: The paper strip method of pH testing should be deleted as an option. This is not practical for testing slurry. The dark colored fluid obscures the result.
6. 455-15.9.3 Wet Excavations: The requirement for 10 feet of tremie embedment seems excessive. 5 feet should be sufficient.
7. 455-16.3 Support, Alignment and Tolerance: Second paragraph, 6th sentence reads "Use *concrete* spacers constructed of approved *noncorrosive* material." I've never seen a

spacer made of concrete. The plastic spacers work fine. I recommend we allow them also.

Response:

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Comments:

I have the following comments / questions for your consideration:

1./ Section 455-11.5: I agree with District 3 that we should not pay for the Dynamic Load Test for piles with pre-planned epoxy dowel splices. The only project that we have used the pre-planned splice is Contractor's decision due to his means and methods. Why should the Department pay the Contractor more money for a decision that is under the Contractor's control ? However, I think that it is fair that we should pay the Contractor separately for unforeseen splices, since the Department's authorized pile length does not work in that situation. They should not anticipate that in the unit bid price before they get the project. My suggestion is a change in Section 455-11.5, showing "No payment will be made for dynamic load tests used to evaluate the integrity of pre-planned epoxy-bonded dowel splice ……."

2./ Section 455-11.6 shows "The quantity to be paid …….. as shown in the Plans, with no allowance for variable depth surface profiles." Do you mean "with no allowance for variation of actual penetration depth or tip elevation" ? If it is, I suggest a clarification is needed as the current phrase is difficult to understand. The following question is that if it is acceptable not to meet the minimum tip elevation. I guess the Engineer has to make the determination on a case-by-case situation after consulting with the Engineer of Record of the wall.

3./ Section 455-15.4: The added paragraph indicates "If the temporary casing tip elevation is advanced deeper than the Top of Rock Socket Elevation shown in the plans, advance the excavation one-half of the distance between ……. " Presumably, the distance is the additional length of the drilled shaft; not the total length. I know it does not make much sense to interpret otherwise, however, the sentence is not clear. Please consider substituting the phrase "advance the excavation" with "increase the required rock socket length by" for clarity (if our interpretation is correct).

4./ Section 455-15.4: Third paragraph (below the added text), show "if backfilling". Since the option to stabilize the excavation with slurry is now removed, the phrase "to backfill" seems more appropriate.

I have one more question / comment which is not directly related to the Industry Review, as follows:

A./ Initial Setcheck: According to 455-5.10.4 (a), "the Engineer may require the Contractor to interrupt driving **at least** 15 minutes prior to performing a set-check." This is the "initial setcheck" in the Specifications. The current practice is that the initial setcheck is performed up to 15 minutes after initial drive. This is also taught in the CTQP class likewise. However, the phrase "at least" seems to indicate otherwise. It seems to mean the initial setcheck will be performed at least 15 minutes after initial drive. I think some clarification may be needed in 455-5.10.4 to reflect what is being done in the field.

If there are any questions, please let us know. Thank you.

Response:

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Keith Waugh
Construction Conference
Feb 25, 2008

Comments:

455-1.1	When sheeting and shoring is not shown in the plans but required to prevent damage to existing structures it will be considered critical and designed by FDOT. Work would be considered extra work.
455-1.2	In lieu of excavation, predrill. Protection of the pile during excavation is Contractor's responsibility. Need to delete density requirements.
455-2	Delete Static Load Tests and all references throughout 455. Write TSP on project by project basis.
455-5.1.1	Starter holes should be allowed for all piling up to 25% of initial length. Drill diameter: use minimum in lieu of specified. FDOT to review Industry concerns and possibly address suitability of hole/pile relationship instead of tabular requirements. Remove reference to "concrete sand".
455-5.2	Remove first sentence. This is covered in 455-10. Delete references to jump sticks.
455-5.3.1	Allow the use of commercially available and manufactured wire rope hammer cushions.
455-5.3.2	Pile cushions should be adequately sized to protect the head during driving. Oak should be allowed. Remove "protect from weather and keep dry". Pads that get

rained on should not be considered “soaked”. Allow payment for additional pads as multiplier of pile unit price.

455-5.6 Reduce the section to providing template or fixed or semi-fixed leads adequate to maintain pile position during driving.

455-5.7 Address jetting. Pile installation data table in plans should be used.

455-5.8 A definition of “hole” is needed. Is it an open orifice or a disturbance of soil that will allow penetration to desired depth? Again, address jetting.

455-5.9.3 Add “when shown in the plans, required by the Engineer” regarding when payment is authorized. Add limits used for measurement.

455-5.9.4 If an open hole is required but not shown in the plans it should be considered extra work.

455-5.9.5 Payment for grouting shown in the plans should be a multiplier of the unit price for piling.

455-5.10.1 Include skin friction and freeze.

455-5.10.2 Delete “the Contractor may”.

455-5.10.4 (a) The end of first sentence needs to reference “initial” set –check.
Second sentence, “to 12 inches of driving”.

455-5.10.4(c) The Contractor needs to be allowed input on the use of PDA for acceptance of redrives and set-checks.
Add “Payment for instrumented set-checks or redrives would be a combination of (a) or (b) plus a dynamic test load.

455-5.10.5 Last sentence “due to pile heave in accordance with 455-5.10.4.”

455-5.11.3 Review safety factors for temporary piles

455-5.12.1 Delete requirement of having jet pump on-site for test piles.

455-5.12.4 Delete last sentence.

455-5.13 Delete 9. Other
Delete references to Contractor supplied generator, shelter, etc.
Address payment of additional cushions when directed and pads are still in compliance with 455-5.3.2.
Waiting period for the two set-checks should be a combined 60 minutes.

455-5.14.2 Address overruns and underruns that vary more than 15%. Changed conditions require compensation.

455-5.14.3 Delete “These lengths represent…..remain in the completed structure.”
Address time for supplying lengths and criteria. Five work days is reasonable.
Address substructure elements in lieu of “all test piles”. Address “operations in phases designated by the Engineer”.

455-5.15.2 Address tolerances in accordance with DCE Memo 22-07.

455-5.15.5 Delete “Unforseeable Work” and replace with “all additional work”

455-5.16.1 Delete all references to steel pile and the Department retaining ownership of cutoffs.

455-5.16.2 Second sentence, delete “at no expense to the Department”. Add “All work of pulling, cutting off, or disposing of unsuitable test piles will be considered as extra work.

455-7.3.1 Delete “aged for at least 7 days” and add “been cured in accordance with Section 450”

455-7.3 Delete references to “plans” and replace with Standard Index.

455-7.6	Delete entirely. This is covered in 455-5
455-7.7.2	Move (f) Place forms…. To after (c).
455-7.7.3	Allow the use of forms that provide similar appearance and concrete the same Class as the substructure.
455-8.3	Delete references to AWS D1.1or API 5L.
455-8.7	Coatings needed better clarification. All coatings should be shown in the plans.
455-9.3.1	Add “drilling” to last sentence.
455-9.4.1	Remove “prestressed” and “driven”. Replace driven with installed.
455-9.4.3	Add “drilling” similar to 455-9.4.1
455-10	Revise completely, removing items that are discussed elsewhere in the specifications.
455-10.2	Replace “at no additional cost to the Department” with “with no additional compensation to the Contractor.”
455-11.2.2	“subject to provisions of 455-11.2.3 through 455-11.2.10, 455-11.9, 455-11.10 and 455-11.14.
455-11.2.5	“the length of pile will be measured” (Deleted “driven”)
455-11.2.7	Add “by the Contractor” after “otherwise damaged..” Delete last sentence.
455-11.2.9	“no separate pay for the initial two set checks within 60 minutes. Two additional set checks with xx hours of initial driving will be paid as xx feet of piling”.
455-11.2.10	“no separate pay for one initial set checks within 15 minutes” Set-checks performed more than xx hours/days after end of initial drive will be considered extra work.
455-11.4	Delete last sentence
455-11.6	Some wanted payment by linear feet, others by square feet, others by lump sum. Still need more input….
455-11.9	Allow payment for splices when authorized lengths are in excess of lengths allowed on Index 20600 and for splices shown in the plans. Delete last sentence.
455-11.9 (a)	add “generally conform”
455-11.14	add “required penetration after driving” to last sentence. Grouting of pile holes, when shown in the plans, should be paid for as an additional 50% of one foot of piling for each foot of grouting. Payment for all holes shall be measured from existing ground or bottom of excavation to the bottom of the disturbance.
455-12.3	Delete “and the cost of predrilling pile holes described in 455-5.1.1.
455-12.5	“required to assist the Engineer in performing this work.”
455-12.6.1	Delete “including preformed holes and painting”. Use “coating” in lieu of “painting”. Anchors for temporary walls should be paid per each as done for permanent walls.
455-12.9	Address points of measurement similar to 455-11.14. Casings required to maintain an open hole, should be considered extra work.
455-12.13	Address integrity of a non-driveable splice.
455-12.14	Industry believes that payment for cutoff should remain as is.

General:
All time frames in the specifications need review and possible revision.

All factors for miscellaneous work (splices, redrives, set-checks, holes, PDA, pads, etc) need review. Industry needs to supply FDOT with current backup documentation.

Response:

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