

4550512 STRUCTURES FOUNDATIONS  
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

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Tim Counts  
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Comments: (6/8/20, Internal)

Are there any requirements for the PDAs or EDCs? Do these exist on the APL?

Response:

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Arthur Berger  
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Comments: (6/8/20, Internal)

June 8, 2020

I suggest that the comma between tip and EDC (see arrow) be deleted so it all reads as one concept. The comma after gauges may not be needed, however, I don't have a big problem with that comma.

Art Berger

**455-7.2 Manufacture:** Fabricate piles in accordance with Section 450. ~~When internal gauges will be used for dynamic load testing,~~ supply and install top and tip internal Embedded Data Collector (EDC) gauges in all square prestressed concrete test piles, and either top or top and tip, EDC gauges in square prestressed concrete production piles monitored with internal gauges in accordance with Standard Plans; Index 455-003. Ensure the internal gauges are installed by personnel approved by the manufacturer.

Response:

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Ananth Prasad  
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Comments: (6/8/20, Internal)

Rebecca – Ananth requested we remove all references to PDA or EDC as shown in the screenshot below. Please check all the submittals for 455 and coordinate this change with Larry. I think Scott and/or Juan also submitted changes to 455, but I don't know if they included any specific references to PDA or EDC.

Either way, just double check those as well. We need to send back to Ananth once they're updated for approval prior to sending out to Industry Review.

**455-5.13.1 General:** All test piles will have dynamic load tests. All square prestressed concrete test piles will be monitored with external [Pile Driving Analyzer \(PDA\)](#) gauges and internal [Embedded Data Collector \(EDC\)](#) gauges concurrently. Drive piles of the same cross-section and type as the permanent piles shown in the Plans, in order to determine any or all of the following:

1. installation criteria for the piles.

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State Specifications Engineer  
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Response:

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Ananth Prasad  
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Comments: (6/18/20, Internal)

Only one comment, use “embedded gauges” terminology instead of “internal gauges”.

Response:

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No Name

Comments: (7/2/20, Industry)

I recommend two options (one is Instrumentation only and other is Instrumentation and Post Processing) because Signal Matching Analyses(for PDA) and FDOT Method(for EDC) are same as post processing.: Externally Mounted Instrument System (and signal matching analyses) or Embedded Gauge (and FDOT Method)

Response:

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Jeongsoo Ko  
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Comments: (7/2/20, Industry)

I recommend two options (one is Instrumentation only and other is Instrumentation and Post Processing) because Signal Matching Analyses(for PDA) and FDOT Method(for EDC) are same as post processing.: Externally Mounted Instrument System (and signal matching analyses) or Embedded Gauge (and FDOT Method)

Response:

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Comments: (7/2/20, Industry)

: Proposed Change: 455-5.13.1 General: All test piles will have dynamic load tests. All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently. Proposed change: 455- 455-5.14 Dynamic Load Tests: ..... For all square prestressed concrete test piles, install embedded gauges in the piles in accordance with Standard Plans, Index 455-003 and attach external instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing. For other types of piles, either install embedded gauges in the piles in accordance with Standard Plans, Index 455-003, or attach external. Proposed Change: 455-7.2 Manufacture: Fabricate piles in accordance with Section 450. When internal gauges will be used for dynamic load testing, supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system, in accordance with Standard Plans, Index 455-003. Ensure the internal gauges are installed by personnel approved by the manufacturer. Comments: All these changes are related to the dual use of external gauge and embedded gauge for test piles. These changes add cost to the Department without any proven benefits. The issue of external and internal monitoring for pile capacity has been researched for years. To mandate on all projects dual monitoring is inefficient and will add unnecessary cost to the project. It should be left to the contractor what process they would like to use based on economics. If the Department would like additional data, they should do some specific project as additional research. Mandate both on all contracts is wrong and give the perception that they are forcing the embedded system into the contracts because they can't be competitive in the open market.

Response:

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Comments: (7/6/20, Industry)

Structures Foundations) Specification Section 455-7.2 states, "Ensure the internal gauges are installed by personnel approved by the manufacturer." This sentence should be revised to read, "Ensure embedded gauges are installed by personnel approved by the manufacturer."

Response:

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Paul Passe  
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Comments: (7/8/20, Industry)

I have the follow comments on the spec changes: 1. Under 455-5.12.1, 455-5.13.1, 455-5.14, and 455-7.2 isn't "embedded" gauges proprietary to EDC? Won't the generic "internal" gauges be better? 2. Under 455-5.13.1 General: Why is it being required to test the pile with two different systems. Since both systems have been accepted one system should be selected at beginning of project and not waste money using multiple systems. Also, EDC is a sole source system and by requiring its use wouldn't that be in violation Florida statutes. 3. Under 455-5.14 Dynamic Load Tests: Again, why is it being required to test the pile with two different systems. Since both systems have been accepted one system should be selected at beginning of project and not waste

money using multiple systems. Also, EDC is a sole source system and by requiring its use wouldn't that be in violation Florida statutes. 4. Under 455-7.2 Manufacture: Again, why is it being required to test the pile with two different systems. Since both systems have been accepted one system should be selected at beginning of project and not waste money using multiple systems. Also, EDC is a sole source system and by requiring its use wouldn't that be in violation Florida statutes.

Response:

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Comments: (7/6/20, Industry)

The Specification should not require two systems concurrently. Both systems provide similar information, therefore there is no added value nor cost savings. To the contrary, this is now "added cost" to the detriment of the taxpayer. Furthermore, the FDOT had sponsored the University of Florida, a public institution, to perform research on EDC since 1997. However, the EDC system has been transferred to a private firm. Of additional concern is the risks to the Government/FDOT with only one commercially available "internal" gauge system that is now mandated, at additional cost to the taxpayers, founded over 20 years ago using taxpayer's dollars. Given that not much can be done now relative to the historical public support now benefiting a private company vis-à-vis the EDC's origins, the Government should at least now take the opportunity to mitigate those risks to not further waste taxpayer's money to subsidize a private product. Therefore, the following change is suggested: All square prestressed concrete test piles shall be monitored with EITHER an external gauge system with signal matching OR an internal gauge system with signal matching. The internal gauge option, if selected, should come at no additional cost to the department.

Response:

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Comments: (7/9/20, Industry)

We disagree with the change in Section 455-5.13.1 requiring that "All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently". Since the embedded gauge (EDC) system is a private system owned by only one company (Radise), and not open or available to all firms, this change unfairly benefits these specific firms and stifles competition, at the cost of other local firms, including many Disadvantaged Business Enterprises (DBE) and Minority Business Enterprises (MBE), at an increased undue cost to the taxpayer without any measurable benefit. With the one group (Radise) being the only entity that can perform EDC, they will be unfairly advantaged and will be able to provide both internal and external gages with a single on-site representative, significantly handicapping any other competitor. Please note that EDC is currently a practical/unfair monopoly, and the owner of the EDC system does not offer this technology or training to outside firms. Thus, there is no way for any firm (other than Radise- the owners of the EDC system) to be competitive.

Response:

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No Name

Comments: (7/13/20, Industry)

455-5.12.1: No reason to change the word from internal to embedded. 455-5.13.1: There is no added benefit for requiring both internal and external gages on test piles. Point in fact, this will cost more money for requiring 2 systems. Furthermore, will requiring 2 systems on test piles, result in requiring 2 consultants monitoring one or the other system, further increasing cost of the test pile program? If the same consultant can monitor both systems concurrently, that consultant will need to have 2 personnel with 2 systems to monitor both systems, resulting in an elevated cost for the test pile program. It should not be required to have both systems to monitor a test pile. This should be at the discretion of the Engineer or Contractor's option (conventional project or design build project). 455-5.14: See comment for 455-5.13.1. There is no reason to require both internal and external gages for test piles. Specification changes benefit only the Radise group of companies (Radise, Smart Structures and Applied Foundation Testing) who have monopolized the use of EDC. Radise has not provided outside training to industry users only internal training and training for FDOT personnel. By requiring both systems in test piles, Radise will control dynamic testing and costs associated with it. This is highly unrealistic and outrageous. Again, what benefit does this provide the Department? 455-7.2: See comments from 455-5.13.1 & 455-5.14.

Response:

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Thomas Petty  
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Comments: (7/13/20, Industry)

I have the following comments on the proposed changes to Specification 4550512 Structures Foundations: 1. In reference to 455-5.12.1 General, the proposed specification changes the use of the word "internal" to "embedded" gauges. Is the word "embedded" proprietary in that it references only one technology which shares the same name, Embedded Data Collectors (EDC)? If so, this appears to be a conflict of interest to the extent that it singles out only one company which produces this technology. The use of the word "internal" gauges appears to be more appropriate as it can refer to other technologies that may arise in the future. Additionally, the specification also indicates that an externally mounted instrument system must be used in conjunction with signal matching analyses to determine pile capacity while no signal matching is indicated with the use of "embedded" gauges. It is my understanding that the FDOT Tran Method analysis is a requirement when using Embedded Data Collectors (EDC) and thereby serves as a signal matching analysis for EDC data to determine pile capacity. Specifically, FDOT Tran method has been performed in conjunction with EDC as a means to verify bearing capacity and often times the pile capacity determined by FDOT Tran Method varies by more than 10% from that which is presented as the average mobilized pile capacity based on the EDC data. As such, both externally mounted instrument systems and embedded gauges require that a signal matching analysis be used to determine pile capacity and the language utilized in the specification should reflect this. 2. In reference to 455-5.13.1 General and 455-5.14 Dynamic Load Tests, the proposed specification change requires that "All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently." The cost associated with utilizing both test methods for every test pile does not

appear to be of any significant added value. During driving of test piles externally mounted gauges can be damaged which can lead to delays, while on the other hand embedded gauges often have wireless connection issues or require battery changes, which can also lead to delays for the Pile Driving Contractor. By mandating that both test methods be used for test piles, the specification now introduces twice the potential for delays to the Pile Driving Contractor, which costs time and money. Another issue when mandating that both test methods be used for every test pile is the potential conflict that may arise when the engineer operating the externally mounted system is in disagreement with what is being observed by the engineer operating the embedded gauge system. For example, if the engineer recording data with the externally mounted system suspects that the pile is developing tension cracks as a result of bending stresses and insists on terminating pile driving to prevent further damage, while the engineer operating the embedded gauge system does not agree and insists on continuing to drive the pile. Under what circumstance does one system override the other? Is it the externally mounted system that has been proven and trusted in this industry and been around for more than 45 years or is it the embedded gauge system which has been in the industry for less than half that time and still appears to be in the stages of research and development? Further, the last issue when mandating that both test methods be used for every test pile is the monopolizing conflict. Currently only one company, Radise Group, both produces and has access to the embedded gauge system to use for testing purposes. This appears to be in direct conflict with Florida Statute Title XXXIII Chapter 542 Section 542.19 Monopolization; attempts, combinations, or conspiracies to monopolize which states "It is unlawful for any person to monopolize, attempt to monopolize, or combine or conspire with any other person or persons to monopolize any part of trade or commerce in this state." 3. In reference to 455-7.2 Manufacture, the proposed change states to supply and install "either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system." Based on how this is stated, EDC will have the option to eliminate tip gauges for 100% dynamic testing for production piles rendering it practically the same as an externally mounted gauge system. An additional issue that may arise when using EDC with only top mounted gages is there is currently only one acceptable way to use FDOT Tran Method to verify bearing capacity with EDC and it requires that tip gauges be used. Based on this, if a production pile tips at a significantly different elevation than that of the test pile as a result of variable soil conditions and only top gages are being used with the EDC, how do you verify the bearing capacity of the production pile? In this case there are limitations on EDC, as it does not currently contain the means to verify the damping value (Jc) and bearing capacity of a production pile that utilizes only top gauges and is driven to a significantly different elevation than that of the test pile. As is the case in the state of Florida, there are several areas where this can happen and with the use of the external gage system, you can simply perform a signal matching analysis on the pile that drove deeper to verify the damping value and bearing capacity at that elevation. Thank you for allowing me the opportunity to address what I believe to be concerns with the new proposed specification changes.

**Response:**

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Juan Castellano  
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Comments: (7/16/20, Industry)

1. Sub-article 455-5.13.1 There is a change requiring "All square prestressed concrete test piles will be monitored with external Pile Driving Analyzer (PDA) gauges and internal Embedded

Data Collector (EDC) gauges concurrently." This change should be deleted for the following reasons: • It does not benefit the Department nor taxpayers. • The Department has gone through many costly efforts for the sake of the EDC system. Has the Department evaluated how much money has been spent since the early 2000s, through efforts including but not limited to research, pilot projects, mandated projects, Mandatory Design Memoranda and spec revisions? We already had similar mandates about 10-12 years ago that involved mandated 100% EDC projects and mandated test piles in all projects with EDC, which involved huge projects that lasted 4 years or more. Projects such as the I-595 reconstruction and SR 826 (Palmetto) sections 2 and 5 and many others ended up with this requirement which required hundreds of test piles that must have cost the Department millions already. The cost incurred is not just the cost of gauges but also the cost of hiring a firm to perform the monitoring, which until today, only one firm is qualified to offer. When we issue this type of mandates, the manufacturer which is also the firm supplying the monitoring equipment and currently the only consultant available for monitoring, will not have any incentive to perform these services at an economical cost. On the other hand, this EDC firm has been able to market and get some projects to be changed to use 100% EDC instrumented piles without the need to be mandated by FDOT; this shows they don't need this type of help to get projects. And very likely the cost offered to the contractors in these cases has been very reasonable because there has not been any mandatory requirement. • The memorandum introducing the changes indicates that the purpose of this change is to determine whether dual monitoring of test piles adds value to the Department. This is not a valid argument. We have already a lot of piles performed within the last 4 years with dual monitoring to determine whether dual monitoring adds value to the Department. For example, the Department authorized and spent \$1.5 million on the recently constructed bridges of the Tamiami Trail project in Miami Dade to instrument EDC gauges on about 560 piles. The Design Build firm used PDA in all piles to install and accept them. These \$ 1.5 million were not required by the project. In any case, the dual instrumentation information is available for evaluation. And there are several other mandated projects throughout the state, from the last 3 years or so which should have the data available for evaluation. • This mandate causes not only excess costs on Florida taxpayers money but also on Federal (FHWA) money. If the Department feels obligated to mandate some projects, at least, limit only to projects with State funds only.

**Response:**

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Juan Castellano  
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Comments: (7/16/20, Industry)

2. Sub-article 455-5.14 third paragraph: There is a change requiring "For all square prestressed concrete piles, install internal EDC gauges in the piles in accordance with Standard Plans, Index 455-003 and attach external PDA instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing. For other types of piles, attach external PDA instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing" This change should be deleted for the following reasons: • It does not benefit the Department nor taxpayers. • The Department has gone through many costly efforts for the sake of the EDC system. Has the Department evaluated how much money has been spent since the early 2000s, through efforts including but not limited to research, pilot projects, mandated projects, Mandatory Design Memoranda and spec revisions? We already had similar mandates about 10-12 years ago that



involved mandated 100% EDC projects and mandated test piles in all projects with EDC, which involved huge projects that lasted 4 years or more. Projects such as the I-595 reconstruction and SR 826 (Palmetto) sections 2 and 5 and many others ended up with this requirement which required hundreds of test piles that must have cost the Department millions already. The cost incurred is not just the cost of gauges but also the cost of hiring a firm to perform the monitoring, which until today, only one firm is qualified to offer. When we issue this type of mandates, the manufacturer which is also the firm supplying the monitoring equipment and currently the only consultant available for monitoring, will not have any incentive to perform these services at an economical cost. On the other hand, this EDC firm has been able to market and get some projects to be changed to use 100% EDC instrumented piles without the need to be mandated by FDOT; this shows they don't need this type of help to get projects. And very likely the cost offered to the contractors in these cases has been very reasonable because there has not been any mandatory requirement. • The memorandum introducing the changes indicates that this change intends to determine whether dual monitoring of test piles add value to the Department. This is not a valid argument. We have already a lot of piles performed within the last 4 years with dual monitoring to determine whether dual monitoring add value to the Department. For example, the Department authorized and spent \$1.5 million on the recently constructed bridges of the Tamiami Trail project in Miami Dade to instrument EDC gauges on about 560 piles. The Design Build firm used PDA in all piles to install and accept them. These \$ 1.5 million were not required by the project. In any case, the dual instrumentation information is available for evaluation. And there are several other mandated projects throughout the state, from the last 3 years or so which should have the data available for evaluation. • This mandate causes not only excess costs on Florida taxpayers money but also on Federal (FHWA) money. If the Department feels obligated to mandate some projects, at least, limit only to projects with State funds only.

Response:

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Comments: (7/16/20, Industry)

3. Article 455-7: This change should be deleted for following reasons: • It does not benefit the Department nor taxpayers. • The Department has gone through many costly efforts for the sake of the EDC system. Has the Department evaluated how much money has been spent since the early 2000s, through efforts including but not limited to research, pilot projects, mandated projects, Mandatory Design Memoranda and spec revisions? We already had similar mandates about 10-12 years ago that involved mandated 100% EDC projects and mandated test piles in all projects with EDC, which involved huge projects that lasted 4 years or more. Projects such as the I-595 reconstruction and SR 826 (Palmetto) sections 2 and 5 and many others ended up with this requirement which required hundreds of test piles that must have cost the Department millions already. The cost incurred is not just the cost of gauges but also the cost of hiring a firm to perform the monitoring, which until today, only one firm is qualified to offer. When we issue this type of mandates, the manufacturer which is also the firm supplying the monitoring equipment and currently the only consultant available for monitoring, will not have any incentive to perform these services at an economical cost. On the other hand, this EDC firm has been able to market and get some projects to be changed to use 100% EDC instrumented piles without the need to be mandated by FDOT; this shows they don't need this type of help to get projects. And very likely the cost offered to the contractors in these cases has been very reasonable because



there has not been any mandatory requirement. • The memorandum introducing the changes indicates that this change intends to determine whether dual monitoring of test piles add value to the Department. This is not a valid argument. We have already a lot of piles performed within the last 4 years with dual monitoring to determine whether dual monitoring add value to the Department. For example, the Department authorized and spent \$1.5 million on the recently constructed bridges of the Tamiami Trail project in Miami Dade to instrument EDC gauges on about 560 piles. The Design Build firm used PDA in all piles to install and accept them. These \$ 1.5 million were not required by the project. In any case, the dual instrumentation information is available for evaluation. And there are several other mandated projects throughout the state, from the last 3 years or so which should have the data available for evaluation. • This mandate causes not only excess costs on Florida taxpayers money but also on Federal (FHWA) money. If the Department feels obligated to mandate some projects, at least, limit only to projects with State funds only.

**Response:**

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Comments: (7/17/20, Industry)

TCOPs staff have reviewed the above and offer comments for 4550512 and SP 4550000DB- (K.C.Jose) 4550512:- The proposed change is to evaluate a suggestion from FTBA whether dual monitoring of test piles adds value to the Department. 455-7.2 Manufacture: Fabricate piles in accordance with Section 450. When internal gauges will be used for dynamic load testing, supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system, in accordance with Standard Plans, Index 455-003. Ensure the internal gauges are installed by personnel approved by the manufacturer. Comment- In both cases, the system allows the Engineer to monitor the stresses in the piles; therefore installing dual systems, EDC & PDA concurrently may not add any value to Department. SP 4550000DB- D455-5.13.1 General: All test piles will have dynamic load tests. All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently: Comment- In both cases of gauges, the system allows the Engineer to monitor the stresses in the piles; therefore installing dual systems, EDC & PDA concurrently may not add any value to Department. No Comment on 5480805 and 7151005. Thanks for the opportunity to review. Sincerely, K. C. JOSE, P.E. Construction Senior Project Manager D4 - Treasure Coast Operations 3601 Oleander Ave., Ft. Pierce, FL 34982 Office: 772-429-4936; Cell: 772-519-2348. [Kandarappallil.Jose@dot.state.fl.us](mailto:Kandarappallil.Jose@dot.state.fl.us)

**Response:**

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Comments: (7/17/20, Industry)

SP4550000DB General Comments: It is very obvious that a majority of the proposed specification changes benefit only the Radise group of companies (Radise, Smart Structures, and their newly acquired Applied Foundation Testing (AFT)) who have monopolized the use of

EDC. Prior to the Radise purchase of Smart Structures many companies, including mine, were routinely testing piles with EDC after paying a sum of \$10,000.00 to AFT for training. Since the Radise purchase of Smart Structures all of our training has been nullified and only the Radise group of companies can perform the work. Many companies have made the request for training and none have been trained. Thus, all specified EDC work has been done by them for years now. While I do not know the exact amount, it is likely millions of taxpayers' dollars have been paid to this monopoly. This alone is perhaps worthy of filing a whistleblower complaint with the office of the Inspector General. Now seeing this specification providing a more biased spin toward EDC systems is even more concerning as a taxpayer, and as someone who has been in the deep foundations industry for decades. As an Engineer, working exclusively in the deep foundation industry for over 20 years I must state that many of the proposed changes just do not make sense technically. I have used both internal and external systems for 100% dynamic monitoring jobs. Both have worked well under certain conditions and I always support the development of new technologies. Furthermore, I understand that most of the time industry needs a nudge to accept new technology (the EDC has been in play for 20 years). However, at the very least there should be many companies that would have received training and are qualified to perform the work before a specification change is contemplated. There are not even published guidelines in the Soils and Foundation Manual for evaluating EDC data using current Tran method calculations. What qualifies as a good match? How close should accelerometer calculated displacements and equivalent blow count match inspector observed measurements? Is it acceptable to use quake and damping values well outside of the range that has been historically acquired by practitioners in the industry, and recommended values in WEAP to develop driving criteria? Furthermore, there is not a recognized certification process in place similar to those offered by Foundations QA and PDCA for external gages type testing, which are largely independent of the equipment manufacturer. Radise/Smart Structures authorizes only themselves. It is not well understood which capacity method is to be used with EDC; even by them. On every job I have been involved with there is a dispute if UF or Tran method is used. Utilizing EDC/Tran method as stand-alone test pile has not been well vetted by industry. To my knowledge, only the Radise groups have performed this work. Most of us in the industry are not comfortable with this yet largely based on our past experiences with EDC. This specification is prepared for "Standard" work, not research, or that it only be performed by a single entity (group of closely held singularly-owner companies). Specification Comments: 455-5.12.1 Regarding the change from internal to embedded. I am not sure if this is a patented term specific to EDC systems or not. Nevertheless, it clearly favors a decided unfair commercial advantage to a group of closely held companies (Smart Structures, Radise, AFT). They are the sole source providers of embedded data collectors, sold to contractor, and EDC monitoring systems. This basically guarantees the Radise group a large portion of work in the state as a sole source provider. This does not promote fair competition instead it supports a monopoly. I suggest before using the term "Embedded" you speak with the Smart Structures and confirm the use of this term does not stop others from using internal gauges. Needs to be clear that Tran method will be used for capacity. 455-5.13.1 The FDOT specs. requirement to use both internal and external systems is ludicrous and represents a gross neglect of being a good steward of taxpayer money. The EDC systems were approved to be used for 100% dynamic testing years ago. There have been no issues with pile driving that suggest two systems are needed to do the job one or the other has done for nearly 20 years. This accomplishes two things. The first is wasting taxpayer money and the second is guaranteeing public work for the Radise group; essentially creating the conditions for supporting a monopoly. If more research is needed follow the proper channels and put the work up for competitive bid. Although it might be difficult because it is tightly held by the Radise

group. I defiantly agree that more research is needed to use EDC piles as test piles without 100% monitoring. While the Tran method has shown to reasonably determine pile capacity the ability to determine reasonable values of quake and damping have yet to be proven. In one instance on a project we were performing VT on EDC test piles and the criteria blow count changed by 100% at the same stroke level. While I attribute this largely to the inexperience of the Radise group operator, the fact is that the signal matching process and associated methods to determine WEAP parameters is highly subjective to the displacement used for the calculations. EDC equivalent top of pile displacement rarely correlates well to the observations of the actual blow counts in the field ad reported by the certified field inspector. In fact, based on poor quality data that I have seen, EDC top equivalent blow counts can be on the order of 3 times less than that observed by the inspector. Much more work is needed to use EDC as standalone test piles! 455-7.2 Yet another conflict of interest serving the interest of the Radise companies. Now they get to approve who installs the gauges that only they can manufacture and use. I guess that is par for the course since they also certify users of the EDC equipment and will only lease equipment to those they certify. Does PDI, Allnamics, Olson, Geokon, BDI, etc. get to decide who can use their equipment? Is there an approved top only EDC method?

Response:

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Comments: (7/21/20, Industry)

The State is proposing modifications to the FDOT specifications for both design-build and conventional specifications that favor the use of embedded gauges (i.e., EDC). Essentially the specifications will provide favoritism to the use of EDC, which is solely provided by one company. The proposed specifications would:

- 455-5.13: Require the use of EDC and PDA on all test piles: this would increase use of tax payer dollars by using two dynamic load testing systems There is no technical advantage to using an EDC versus PDA therefore no need to use both systems. This specification change seems to favor one family of companies that are the sole provider of embedded gauges (i.e., EDC). I do not agree with this proposed modification.
- 455-5.14: Require the use of EDC and PDA on all test piles: this would increase use of tax payer dollars without added benefit. See comments above for 455-5.13. I do not agree with this proposed modification.
- 455-5.19: Allow company that provides EDC to sign off on foundation certification packages: This specification would allow a third-party that is not involved during the design phase to certify a foundation. They will certify that the foundation is satisfactory for compression capacity, tension capacity, integrity, settlement, and lateral capacity (testing company is not involved with the majority of these items). To reduce risk and reduce use of tax payer dollars, the Engineer of Record should be the only professional to certify their design. They have intimate knowledge of the design and subsurface conditions, and no other professional should be allowed to certify a foundation. The testing company would be allowed to override design documents prepared by structural or geotechnical engineers. I do not agree with this proposed modification.
- 455-10.1(14): Eliminate piling inspector only when EDC are used: This will reduce the quality of pile installation and make one person perform two assignments during pile driving. This will

increase the risk to the department for defective work. I do not agree with this proposed modification.

• 455-7.2: Control of Personnel that Install EDC Gauges: EDC manufacturer would be the sole company approving who can install embedded gauges on piles. Other manufacturers do not have say over who can use their equipment (i.e, Pile Dynamics, Olson, GEOKON, etc.) so why should one company have sole oversight? I do not agree with this proposed modification.

Response:

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Jordan D Nelson  
(813) 495-7937  
[jnelson@h2rcorp.com](mailto:jnelson@h2rcorp.com)

Comments: (7/22/20, Industry)

455-5.13.1 I disagree with running these two systems concurrently. If they are equivalent to each other, this is only adding unnecessary cost to the test pile program. Either test method should be acceptable. This comment also applies to language in 455-5.14 and 455-7.2

Response:

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Frank Townsend  
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[ftown@ce.ufl.edu](mailto:ftown@ce.ufl.edu)

Comments: (7/23/20, Industry)

I disapprove of the proposed change. The problem is: the old spec: "Dynamic load tests using an externally mounted instrument system and signal matching analyses OR embedded internal gauges", is good. The new spec says: "prestressed concrete test piles will be monitored with an external gauge system AND an embedded" Substitution of "and" for "or" creates a monopoly for EDS, as EDS is a proprietorial product. Thus my objection is not technical, but the fact that EDS will squeeze out those offering PDA. Now if EDS, was not proprietorial, OK

Response:

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Keith Waugh  
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[kwaugh@lewarecc.com](mailto:kwaugh@lewarecc.com)

Comments: (7/23/20, Industry)

In 455-7.2 the last sentence uses the term "internal". All other use of "internal" has been revised to "embedded". Is there a reason or is this an oversight?

Response:

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Kal Hussein  
(321) 695-7772  
[kal007@aol.com](mailto:kal007@aol.com)

Comments: (7/23/20, Industry)

These changes appear not needed at all and pause a waste of time and money for an unproven and unjustified technique. Current practice is proven, efficient and economical thus, no need to bring in such unjustified modifications. These modifications will be cumbersome, unproven, unneeded, costly and totally uncalled for.

Response:

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Will Vaughn  
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Comments: (7/24/20, Industry)

455-5.12.1 Agreed. Allowing optional methods creates more fair practices for the industry. 455-5.13.1 Disagree. Specifying two systems on all test piles seems excessive. Consider leaving the original language as-is or adding a statement to allow select projects to employ the dual monitoring methods for comparison of added value. 455-5.14 Disagree. Reiterates the use of dual dynamic measurement systems concurrently. Consider leaving optional depending on dynamic methods being employed. 455-7.2 Disagree. Reiterates the use of dual dynamic measurement systems concurrently. Consider leaving optional depending on dynamic methods being employed.

Response:

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Andrew Thomas  
(904) 762-4605  
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Comments: (7/24/20, Industry)

The requirement to needing both external gauges and embedded gauges on the same pile will not provide any significant technical improvements on the current external gauge system. This would be a very costly process which will likely not help install safer foundations since the embedded gauges and external gauges provide very similar data. In order to improve on the current system, I would propose moving away from the typical test pile program and going to 100% PDA Testing for foundation units. This provides a higher technical and economic impact since PDA data is collected for all piles and the reduced phi factor with 100% PDA testing will result in shorter piles.

Response:

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Angelo Soldati  
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Comments: (7/24/20, Industry)

Embedded gauges provide no additional value to the Owner and will just increase the cost of performing the work. I strongly advise against the changes

Response:

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David K.Crapps  
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Comments: (7/24/20, Industry)

Comments Regarding 4550512: Specifications require a consensus between the Department and Industry. I think the Department's proposal will open a lot of hostile discussion about who this helps. I think there will be many who will argue that there is little to no extra benefit to the Public.

Response:

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Mustapha Abboud, P.E.  
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Comments: (7/24/20, Industry)

The changes are highly biased and deliberately unfair against other testing firms. Not really beneficial or needed. Either method of testing is sufficient.

Response:

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Mike Woodward  
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Comments: (7/24/20, Industry)

The memorandum that was attached to this specification indicates the proposed changes are for the purpose of determining whether dual monitoring of test piles adds value to the Department. This sounds like a research project. Is there a defined period for this evaluation to occur? Requiring EDCs on all test piles will create a monopoly for RADISE, since they are the only ones who can use embedded gauges (per their patent), and other firms who provide PDA testing will be severely hindered because contractors would likely hire RADISE to provide the external gauges too.

Response:

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No Name

Comments: (7/24/20, Industry)

The proposed "all square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently" is a costly proposal that has no justifiable technical, economic, or logical reason. Requiring each pile to be tested twice at the same time is wasteful and unnecessary and provides no benefit to the FDOT. At best, change "and" to an "or" and remove "concurrently". The choice of which testing system to be used on any given project should be left up to the responsible engineers and contractors based on the requirements of the job and freely procured under the fair rules of open market competition and level-field treatment by the specification to ensure technical and economic efficiency to the FDOT and protect public interest. Requiring the "supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system" is wasteful and has no justifiable technical, economic, or rational reason. It is also biased and unfair because it references only a specific EDC system to the exclusion of any other. Requiring Index 455-003 promotes the

exclusive use of a specific patented system offered by a single source supplier and excludes everyone else from participating in a fair and competitive open-market procurement process for public works. The proposed changes allow the Dynamic Testing Engineer only if testing with EDC system to take on additional roles and responsibilities and replace the site inspector and certain functions of the design engineer. This is quite technically worrisome on how it will affect the proper pile installation work and Certification of the foundation unit; and is highly biased against and deliberately unfair to the many other dynamic pile testers who for decades have been successfully using the external reusable gauges system. The FDOT is a custodian of the public interest and taxpayers' money. Dwindling available public funds must be used efficiently and wisely. The proposed changes to the 455 standard specifications are misguided, wasteful, and unnecessary. They do not solve an existing problem, do not benefit the FDOT, do not add to the well-being or safety of the public (and could potentially detract from safety and foundation reliability); and stifle fairness, level-field, competition, and open-market public procurement of pile testing service. None of the proposed changes are in conformance with national practice.

**Response:**

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Jack Waldron  
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Comments: (7/27/20, Industry)

I would like to start by pointing out the extensive addition of Embedded data collector additions to the specifications. This appears to be a progressive approach to offering a wider range of dynamic testing options however the reality is different. We offer dynamic testing services using the PDA and would love the ability to offer those services using the embedded data collector as well. The issue is that the Embedded data collector is not being offered for sale from Radise, the company that owns rights to the patent. This is a huge issue now since any contracts that will be awarded in this field will be required to include a company with access to EDC (only Radise). This is a serious violation of monopoly law.

**Response:**

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JC Miseroy  
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Comments: (7/27/20, Industry)

These comments also apply to SP4550000DB. The cover letter states that some changes were requested by FTBA to determine whether dual monitoring of test piles add value to the Department. I don't believe that FTBA is in favor of dual testing. My understanding is that FTBA believes that the type of pile monitoring system should be the choice of the contractor. 455-5.12.1 - This sub-article states External OR Embedded Gauges. 455.5.13.1 - Test Piles. This sub-article states all square prestressed pile will be monitored with an External AND an embedded gauge system. Why do we need both internal and external systems? Replace AND with OR as in 455-5.12.1 455-5.13.14 - Dynamic Test Loads. This sub-article also states to monitor test piles with internal and external systems. Why? How does this add value to the Department. 455-7.2 - Manufacture of prestressed concrete piles. This sub-article states 'Supply and install top and tip embedded gauges in ALL square PS concrete test piles and either top or top and tip, embedded gauges in square PS concrete production piles monitored with an



embedded gauge system'. This needs clarification as follows: Does this mean a). All PS concrete production piles? b). All PS concrete production piles to be monitored? Or c). Only PS concrete production piles to be monitored by embedded gauge systems? As mentioned above, the choice of external or embedded systems should be up to the contractor.

**Response:**

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Peter McGovern  
(401) 569-6823  
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Comments: (7/27/20, Industry)

Similar to my comments on SP4550000DB, I vehemently oppose the suggested change in this industry review. I find it both fiscally and professionally irresponsible to mandate a redundant data collection system. At a minimum, the Contractor should be given the option for either/or embedded or external data collection techniques. Externally connected gauges work. Plain and Simple. they are well studied, reliable and we have some of the world's lead. To mandate an additional system without conclusive evidence the EDC systems provide more accurate data does not seem appropriate. It is a waste of taxpayer dollars and will not provide any additional value to the department. I sincerely hope these changes are not reflected in the upcoming specifications. Thank you,

**Response:**

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Randy Cropp  
(561) 310-7711  
[rcropp@conegraham.com](mailto:rcropp@conegraham.com)

Comments: (7/27/20, Industry)

Please provide the industry with the basis for this specification change. Please provide the name of the state geotechnical engineer that is proposing such change and the basis for the change? Has this proposed change been approved by the district geotechnical engineers? This specification change has NO MERIT. If FDOT has some merit to this specification change, we would like it provided to the industry. After over 10 years of mandates concerning EDC technology and in my estimate over 5 million dollars being donated or used to support this technology it is time to say stop. You must someday be able to walk on your own without support of public assistance. I have used this technology and I have done many cost analyses on this technology and have never found the benefit to use it. If I did, I would be using it as a competitive advantage to my company. I have talked over the years with many of the contractors and cannot find any that are requesting to use this technology in lieu of PDA. The EDC technology works but it comes at a significantly higher price that as a taxpayer I cannot find any benefit for. I have been promised for years this support would end and it still continues. Please justify this to the people who are not working during a time of crisis in our country. The EDC is a sole source technology and has the EDC gone thru all the process to be approved as a sole source item by FDOT, State of Florida and the FHWA. Is FHWA paying for this sole source item? Has the department done its due diligence in analyzing this specification and notified all parties of the cost impact of this specification? Does this specification provide any benefit to FDOT or the Public?

**Response:**

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Gary Kuhns  
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Comments: (7/27/20, Industry)

Recommend changing to: "All square pre-stressed concrete test piles will be monitored with an external gauge system \*or\* an embedded gauge system. Comment: In the majority of cases a duplicate system would not be necessary or cost-effective to achieve the required foundation support. Similarly: For all square prestressed concrete test piles, install embedded gauges in the piles in accordance with Standard Plans, Index 455-003 \*or\* attach external instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing. Further recommend: When indicated in the plans, supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system. Comment: The need to install tip gauges should be determined by the geotechnical engineer based on the geologic conditions at the foundation site.

Response:

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No Name

Comments: (7/27/20, Industry)

Three monitoring devices and three people monitoring one pile at the same time, PDA man, EDC man, and CEI inspector. Very excessive. Lets consolidate to one. How about do some EDC testing/ research and assign 5 projects per district and then see where it goes. We do not want this shoved down our throats.

Response:

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Wing Heung  
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Comments: (7/27/20, Industry)

Comment #1: EDC has some technical advantage over PDA in some geological settings but not all. The proposed change in 455-5.13.1 mandates the use of both EDC and PDA systems in all test piles. Many of these monitoring work will not be benefited from the additional cost. If EDC has a clear advantage over PDA in a project site, the Designer should be able to choose using EDC only and save the cost of PDA testing.

Comment #2: The mandated use of EDC system as proposed by 455-5.13.1 is a concern because the system is available only to Smart Structures and its two sister companies (AFT and Radise). Smart Structures has not made the EDC system available to any other consultants either through purchase or rental. The current mandate in using EDC system in all test piles in all FDOT projects essentially sets up a monopoly to this group in EDC data collection and analyses.

Response:

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No Name

Comments: (7/28/20, Industry)

Proposed Specification: 4550512 Structures Foundations AND Proposed Specification: SP4550000DB Structures Foundations (Design-Build) We disagree with the proposed changes requiring that “All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently.” Redundancy, in this case, is not warranted. An external gauge system or an embedded gauge system will serve the intended purpose. Requiring both unnecessarily increases cost which is neither in the projects’ or the public interest. Engineers and Contractors can use EDC at their discretion. After all, EDC is not exactly new to the market and should be able to stand on its own merits, as do external gauges. If both systems are to be considered equivalent, or at least acceptable, then the market should be able to decide on a case by case basis. The FDOT should also consider that requiring EDC in every situation, they are not only unnecessarily increasing the cost, but assuring revenue to the sole entity that can conduct EDC. Certainly, if EDC is the independent, market driven choice of the users (engineers and contractors) then the sole entity will rightfully benefit, however, the FDOT should look closely at how the proposed unnecessary, but mandated, redundancy may usurp the market choices and, in the process, unfairly enrich a small group of companies owned by a single entity. Specification Section 455-5.18 We disagree with the proposed changes that “For foundation units where all piles are monitored using embedded data collectors, the foundation certification package may be prepared by the DTE, and the DTE may sign and seal revisions to the foundation layout and pile data table if the DTE is prequalified under the appropriate category in Florida Administrative Code (F.A.C.) 14-75.” Pile installation is considered an extension of the design process. The DTE has expertise in assessing the performance of individual piles, but the GFDEOR, as past of her/his design has considered the impacts of their complete foundation analysis. Unless one is knowledgeable of the process leading to the design, they cannot effectively assess potential changes during the construction process. Also, the DTE would be modifying a design that was not completed under her or his direct supervision. Any attempt to create a disconnect between the GFDEOR and the substructure construction in not in the best interest of the profession, or, more importantly, of public safety. Also, the FDOT should consider that this unnecessary and potentially disruptive change in current standards may unfairly enrich the EDC providers who are owned by a sole entity and for no beneficial reason. Specification Section 455-10.1 We disagree with the proposed change that “If the Dynamic Testing Engineer is also a CTQP qualified pile driving inspector, then an additional pile driving inspector is not required when driving piles using embedded data collectors”. The primary responsibility of the DTE is to monitor pile stresses, integrity and capacity. The observation of pile installation including production of the pile driving log, recording hammer blows, hammer stroke height, alignment etc. requires the full attention of the inspector as does the data collection process conducted by the DTE. The DTE cannot provide both functions within standard of care, and an attempt to do so would clearly impact pile integrity, project quality and above all, public safety.

Response:

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Harry Sommer  
(407) 947-9616  
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Comments: (7/28/20, Industry)

The use of embedded gauges has been problematic on some of our past projects. Dead batteries, not transmitting data, and inconsistent data have been some of the problems. With the external gauge system problems have also occurred but can usually be corrected by changing gauges. I believe that it should be the choice of the contractor or EOR as which system should be used. I have had projects where for one reason or another an additional test pile is required and by locating another FDOT approve pile, time lost waiting on casting of another pile with the embedded data collector is minimized. I can not see the advantage of having a collector at the tip and top of a pile. Also having to provide both external and embedded also appears to be unnecessary and a waste of money. Having only one firm which can supply and install the embedded type seems to give them a monopoly.

Response:

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Kathy Gray  
(407) 314-1225  
[pmeadowpmeadow@yahoo.com](mailto:pmeadowpmeadow@yahoo.com)

Comments: (7/28/20, Industry)

455-5.13.1 General, 455-5.14 Dynamic Load Tests and 455-7.2 Manufacture: (comments) The requirement to monitor all square prestressed concrete test piles with both external and embedded gauges is unnecessary. One system is sufficient. The Department conducted an extensive embedded gauge research and development process several years ago where piles were monitored concurrently with both systems. The cost of this process was substantial and the results were conclusive. There is more than enough data from that effort to justify the use of either system by itself. It would be wasteful to spend taxpayer dollars to duplicate what has already been done. Someone once said the definition of insanity is to do the same thing over and over and expect a different result. This may not be insanity, but it is certainly irresponsible. 455-7.2 Manufacture: (comment) A change was not proposed to the last sentence of this Subarticle (“Ensure the internal gauges are installed by personnel approved by the manufacturer.”). However, it may be creating an inappropriate situation if the manufacturer’s personnel are the only ones approved to install gauges. If other companies are not allowed to be trained and certified to install gauges, then this sentence effectively creates a monopoly for the manufacturer. If it does not already exist, a process should be established for approving others such as prequalified Dynamic Testing Engineers (DTE).

Response:

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Reinaldo Villa  
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Comments: (7/29/20, Industry)

• 455-5.13: Require the use of EDC and PDA on all test piles: this would increase use of tax payer dollars by using two dynamic load testing systems There is no technical advantage to using an EDC versus PDA therefore no need to use both systems. This specification change seems to favor one family of companies that are the sole provider of embedded gauges (i.e., EDC). I do not agree with this proposed modification.

• 455-5.14: Require the use of EDC and PDA on all test piles: this would increase use of tax payer dollars without added benefit. See comments above for 455-5.13. I do not agree with this proposed modification.

Response:

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Ernest Cox, III  
(407) 855-3860  
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Comments: (7/29/20, Industry)

I am opposed to the requirement to include both embedded gauges and external gauges in precast concrete test piles. Let the marketplace decide which is more cost effective instead of giving a sole source provider a guaranteed market. Also opposed to the DTE signing and sealing revisions to the foundation layout and pile data table if the DTE is prequalified. The GEOR should remain involved with the project from design through the installation of the piles and should not be replaced by the DTE. Also opposed to the Dynamic Testing Engineer who is also a CTQP qualified pile driving inspector, eliminating the need for an additional pile driving inspector when driving piles using embedded data collectors. They each have their own responsibilities.

Response:

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Kevin Shimp  
(239) 337-0008  
[kcshimp@aol.com](mailto:kcshimp@aol.com)

Comments: (7/29/20, Industry)

I am president of a bridge contracting business and have over 20 years of pile driving and bridge construction on FDOT projects. We have worked with many testing labs and performed hundreds of test piles. This year on T1747 we drove piling on which the designer had pre-selected all the lengths and used 100% EDC testing. With the above experience in mind, I urge the department not to make the proposed change to the specification. From an engineering perspective, PDA has been used all over the world effectively. I cannot understand why we would test piles twice at the tax payer's expense. From a practical perspective, TMC had an exceedingly difficult time at time of bid getting an estimate out of the only company that can bid the work as the only EDC producer. I will never understand why a sole source provider cannot give a critical bid to a contractor until 2 hrs before our entire bid is due. We avoid companies that play those games, but with only one supplier, we could not avoid this issue. Further, it is my understanding that this specification change has been lobbied by the same company that holds the patent on the device. The specification reads "Ensure the internal gauges are installed by personnel approved by the manufacturer." The specification would create a monopoly for the gauge supplier and that supplier, who is a company that also is a CEI firm, can send 100% of the monitoring business to themselves thus cutting all other CEI testing firms that do PDA testing out of the competition. Clearly, there are major ethical hurdles here. FDOT would be dependent on one supplier for all of its pile testing needs. Current PDA labs often give the contractor length date within 36 hrs of driving thus speeding construction. Will this continue to be possible with one firm controlling the whole state? Please leave the option to the EOR and FDOT to choose they type of dynamic pile monitoring that is best for their own individual project by leaving the specifications as they are. Thank you in advance for your consideration.

Response:

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Mingu Kim  
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Comments: (7/29/20, Industry)

455-5.13.1 Our suggested revisions and comments: 1) All square prestressed concrete test piles will be monitored with either an external gauge system or an embedded gauge system, or 2) Delete this sentence as it was already covered by Section 455-5.12.1 Based on our experience with previous PDA/EDC test piles in design-bid-build projects, DTE who performed PDA testing was responsible for developing recommended pile length and driving criteria solely based on PDA testing results, CAPWAP and refined WEAP analysis per guideline in Appendix F of soils and foundation handbook. Other than PDA/EDC capacity comparison which was already done as far as we understand, we do not think mandating the installation of EDC system on all prestressed concrete test piles will provide any benefit to the Department since EDC system is not capable of providing recommended driving criteria. This will only increase test pile cost without adding value to the Department. 455-5.14 Our suggested revisions and comments: We understand that the only pile type that EDC can be installed is square pre-stressed concrete piles. Therefore, remove " either install embedded gauges in the piles in accordance with Standard Plans, Index 455-003, or" from the second sentence. 455-7.2 Our suggested revisions and comments: Remove "all" and "either top or" from the sentence since capacity and integrity in the EDC system are based on both top and tip measurements in UF method and FDOT. The current method of determining pile integrity for EDC testing incorporates the use of the tip gauge (50-point contribution to MPI if static pre-stress change is more than 100 microstrains for 20 consecutive hammer blows per 1/10/2020 SmartPile MPI Field Update). The consultant will need to modify the EDC pile integrity determination process if the tip gauge is no longer required. Also, during our projects serving the verification role to EDC testing, we have had numerous piles where the top gauge displayed issues, making the pile appear to be damaged. The justification supplied by the consultant for why the piles were not damaged was because the tip gauge displayed pre-stress loss of less than 100 microstrains. If the tip gauge is removed, we anticipate more verification testing since this justification will be removed from the equation—meaning more cost to the department. In addition, based on our experience with previous PDA/EDC test piles in design-bid-build projects, DTE who performed PDA testing was responsible for developing recommended pile length and driving criteria solely based on PDA testing results, CAPWAP and refined WEAP analysis per guideline in Appendix F of soils and foundation handbook. Other than PDA/EDC capacity comparison which was already done as far as we know, we do not think mandating the installation of EDC system on all prestressed concrete test piles will provide any benefit to the Department since EDC system is not capable of providing recommended driving criteria. This will only increase test pile cost without adding value to the Department.

Response:

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Comments: (7/29/20, Industry)

I have reviewed the proposed changes to section 455 and I am pleased to see that FDOT is including embedded gauges in square prestressed concrete piles. It has been 9 years since Peter Middendorp and myself published an article in the Deep Foundation Industry magazine, where we concluded: "While the data available at this time may not yet be extensive enough to completely disqualify the pile impedance based damage analysis (including the Beta method) to assess pile damage, there is sufficient reason to carefully re-evaluate these methods at this time. This applies especially to the damage classification used for the Beta method, for which there is now clear experimental proof to question the validity. Finally, the use of PDA to prevent damage during pile driving should be included in this re-evaluation as the EDC system has shown that piles are being damaged even when PDA is applied when they are driven into the ground". As a direct result of these findings George Goble and myself carefully reviewed the Beta Method, which had been developed by George Goble and Frank Rausche in the late 1970s, and found it flawed. This was published in a peer-reviewed paper in 2012 for the International Stress Wave Conference in Japan. It is therefore surprising that it took 8 years before the requirement to include embedded gauges was proposed. The other surprising thing to me is that the change is only suggested for square piles. I would have expected that the change would apply to both round and square piles, but hopefully that will be addressed in a future revision.

Response:

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Comments: (7/29/20, Industry)

Comments: 4550512 Structures Foundations

By: Mohamad Hussein – [MHussein@grlengineers.com](mailto:MHussein@grlengineers.com) – GRL Engineers, Inc.

The following are comments provided in reply to the call for industry feedback on the Florida Department of Transportation's ("FDOT" or "Agency") proposed specification changes to Section 455 of the FDOT's Standard Specifications for Road and Bridge Construction.<sup>i</sup> FDOT has proposed several specification changes to Section 455 through the issuance on July 2, 2020 of two specification change proposals: 4550512 Structures Foundations ("Proposed SF Specification"), and SP4550000DB Structures Foundations (Design Build).<sup>ii</sup> The comments herein address the Proposed SF Specification.<sup>iii</sup> The FDOT's approach of seeking feedback from the industry at large to gain consensus as part of the process before implementing proposed changes to the specifications is appropriate and appreciated.

We have serious concerns with the proposed changes and urge the Agency to reconsider them, as detailed below. In short, the proposed changes clearly violate Florida law and we will seriously consider challenging these changes in state court in the event that the changes take effect. Moreover, the proposed changes run counter to the basic tenant of "fair and open competition" in Florida public procurement. Finally, the proposed changes open future public procurements incorporating the specifications to challenges based on contrary to competition grounds. The following sections explain these concerns and provide detailed comments on each of FDOT's specification change proposals.



## **I. The Proposed Changes Violate Florida’s Administrative Procedure Act, Violate Fair and Open Competition Concepts, and Open Competitive Procurements to Contrary to Competition Challenges**

As an initial matter, the proposed changes violate Florida’s Administrative Procedure Act, run counter to the basic tenant of “fair and open competition” in Florida public procurement, and open future public procurements relying on the specification to contrary to competition challenges.

The proposed changes will violate Florida’s Administrative Procedure Act<sup>iv</sup> because they would be an “invalid exercise of delegated authority” for “fail[ing] to establish adequate standards for agency decisions” and are “arbitrary and capricious.” *See* Fla. Stat. § 120.52(8). For example, the proposed addition to 455-5.13.1 concerning Test Piles requires monitoring with an “external gauge system” and an “embedded gauge system concurrently.” However, there is no reason or benefit to monitor with both internal and external gauge systems concurrently. Accordingly, this unnecessary cost to taxpayers fails to provide an adequate standard for FDOT’s decision and is arbitrary and capricious.

Similarly, the proposed addition to 455-5.14 concerning Dynamic Load Tests requires installation of “embedded gauges” for all square prestressed concrete piles in addition to attaching external instruments. Beyond the lack of necessity as discussed below, this proposed addition applies only to square concrete piles and not to other pile types, such as cylindrical concrete piles or any type of steel piles. Considering what is technically sufficient for all other types of piles is also technically sufficient for square concrete piles, this addition is arbitrary and capricious.

The proposed changes run counter to the basic tenant of “fair and open competition” in Florida public procurement. *See* Fla. Stat. § 287.001. Specifically, throughout the Proposed Specifications, FDOT proposes to change the term “internal” to “embedded” or adds “embedded gauges” or “embedded data collectors” as a requirement. *See, e.g.*, 455-5.12.1 (proposed); 455-5.19 (proposed). The use of these terms gives clear preference to the system promoted by a sole source provider for the implied patented embedded gauges system. These proposed changes will unfairly promote a specific commercial EDC system provided commercially by a specific private sole source provider company, which limits industry choices and favors a monopoly. This is a prime example of the proposed changes causing the procurement process to be genuinely unfair or unreasonably exclusive. Consequently, if these proposed specifications are adopted, there will be no competitive bidding for the internal gauges since EDC gauges are provided by only one company, a clear example of creating the appearance of and opportunity for favoritism. Moreover, by favoring one company, the proposed specification change will eliminate, or severely limit, current dynamic testing/signal matching providers from FDOT work. The results will be disastrous—many engineering firms who have been successfully offering these services for years will face significant layoffs and a loss of available experience and expertise to benefit the FDOT’s public works. Accordingly, some of the proposed changes, as written, run counter to the basic tenant of “fair and open competition” in Florida public procurement.

The proposed changes open future public procurements incorporating the specification to challenges based on contrary to competition grounds. Agency awards in “competitive-

procurements” must not be “clearly erroneous, *contrary to competition*, arbitrary, or capricious.” See Fla. Stat. § 120.57(3)(f) (emphasis added); see also *R.N. Expertise, Inc. v. Miami-Dade Cty. Sch. Bd.*, Case No. 01-2663BID, 2002 WL 185217, at \*16 (Fla. Div. Admin. Hrgs. Feb. 4, 2002) (discussing Fla. Stat. § 120.57(3)(f) provides a standard of review rather than a standard of proof). An agency action is contrary to competition when it creates the appearance of and opportunity for favoritism; erodes public confidence that contracts are awarded equitably and economically; causes the procurement process to be genuinely unfair or unreasonably exclusive; or are unethical, dishonest, illegal, or fraudulent. See *R.N. Expertise, Inc. v. Miami-Dade Cty. Sch. Bd.*, Case No. 01-2663BID, 2002 WL 185217, at \*22 (Fla. Div. Admin. Hrgs. Feb. 4, 2002).

The proposed changes are contrary to competition on several fronts. First, as explained, only one company produces the referenced “embedded gauges” or “embedded data collectors”, EDC. Thus, the proposed changes not only “create the appearance of and opportunity for favoritism” towards that company, they in fact do favor that company to the exclusion of all others. Second, for like reasoning, the proposed changes will make future procurements “unreasonably exclusive.” Finally, the proposed changes “erodes public confidence that contracts are awarded equitably and economically.” There is no reason or advantage to monitor with external and “embedded data collectors”. See, e.g., 455-5.13.1 (proposed). Thus, these unnecessary additions proposed in the changes will waste the state’s taxpayers’ dollars. Each of these grounds independently would sustain a procurement protest as contrary to competition. Accordingly, the proposed changes will open future public procurements incorporating the specification to challenges based on contrary to competition grounds—and those challenges likely will prevail.<sup>v</sup>

In sum, some of the proposed changes violate Florida’s Administrative Procedure Act, run counter to the basic tenant of “fair and open competition” in Florida public procurement, and open future public procurements incorporating the specification to challenges based on contrary to competition grounds. Indeed, to the extent these changes are implemented as proposed by the Agency, we, along with others, will challenge the changes in court.

In an effort to assist FDOT in revising Section 455, we have provided recommendations on the FDOT’s proposed changes. Critical recommendations concern FDOT’s proposed requirement to conduct tests with both external gauges and embedded gauges concurrently and the use of specific internal gauges. See, e.g., 455-5.13.1 (proposed). Any change FDOT makes concerning the use of testing gauges should not require use of both systems concurrently or dictate a specific system for any of the tests, and instead should allow engineers and contractors the choice of which testing system to use on a project based on the requirements of the job. Since various satisfactory systems are available on the market, giving engineers and contractors a choice on which system to use ensures that a proposed change provides level-field treatment to companies, permitting them to freely procure the appropriate system under the fair rules of open market competition. This in turn promotes technical and economic efficiency within FDOT and protects the public interest. By giving engineers and contractors a choice, FDOT can avoid creating the appearance of and opportunity for favoritism; eroding public confidence that contracts are awarded equitably and economically; and causing the procurement process to be genuinely unfair or unreasonably exclusive.

## II. Comments Regarding Specific Proposed Changes Under “Proposed Specification: 4550512 Structures Foundations”

The following provides comments for specific changes proposed in the Proposed SF Specification.<sup>vi</sup> The Proposed SF Specification only addresses four subarticles in Section 455. Accordingly, the following is organized sequentially by those subarticles, with our comments addressing each FDOT proposed change in each subarticle.

### A. 455-5.12.1 General

The Agency proposes to change the term “internal gauges” to “embedded gauges.” Specifically, the current subsection provides:

*Dynamic load tests using an externally mounted instrument system and signal matching analyses or **internal** gauges will determine pile capacity for all structures or projects unless otherwise shown on the Plans.*

The Agency’s proposed change would read:

*Dynamic load tests using an externally mounted instrument system and signal matching analyses or **embedded** ~~internal~~ gauges will determine pile capacity for all structures or projects unless otherwise shown on the Plans.*<sup>vii</sup>

The proposed change is objectionable on two accounts. First, and foremost, the use of “embedded gauges” gives clear preference to the patented system promoted by a sole source provider for the implied embedded gauges. This practice unfairly promotes a specific commercial EDC system by a private sole source provider company, which limits industry choices. Consequently, the practice creates the appearance of and opportunity for favoritism. Moreover, this practice will result in future procurements to be genuinely unfair or unreasonably exclusive. As discussed above (§ I), this proposed change runs counter to the basic tenant of “fair and open competition” in Florida public procurement and opens future public procurements relying on the specification to contrary to competition challenges.

Second, the subsection, as written, provides for the first option for a dynamic load test tests as an “externally mounted” instrument system. The natural word choice to pair with “externally mounted” would be an “internally mounted” system, or as the subsection reads, “internal” gauges.

### RECOMMENDATION:

- Keep subsection as written. Do not change “internal” to “embedded.”
- Reject all other instances where the Agency’s proposed change changes “internal” to “embedded.”

### B. 455-5.13.1 General:

The subsection, as written, requires: “All test piles will have dynamic load tests.” The Agency proposes to insert the additional requirement immediately following that requirement: “**All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently.**”<sup>viii</sup>

The proposed additional requirement is objectionable. First, there is no reason or benefit to monitor with both internal and external gauge systems concurrently. Testing a pile twice at the same time increases cost, but provides no additional benefit over testing it with just one of the systems (which are considered technically equivalent in other parts of the specifications). This unnecessary expense will erode public confidence that contracts are awarded equitably and economically. Thus, this additional requirement is both an unnecessary requirement and an unnecessary cost to taxpayers. Accordingly, this additional requirement fails to provide an adequate standard for FDOT's decision and is arbitrary and capricious.

Second, the proposed change stifles "fair and open" competition and is contrary to competition in competitive procurements. The use of "embedded gauges" gives clear preference to the system promoted by a sole source provider. This practice unfairly promotes a specific commercial EDC system commercially provided by a specific private sole source provider company, which limits industry choices and favors a monopoly. A prime example that the proposed change will cause the procurement process to be genuinely unfair or unreasonably exclusive. Consequently, if the proposed specifications are adopted, there will be no competitive bidding for internal gauges since EDCs are provided by only one company. This is a clear example of creating the appearance of and opportunity for favoritism. Moreover, by favoring one company, the proposed specification change will possibly effectively eliminate, or severely limit, current PDA/signal matching providers from FDOT work. The results will be disastrous—many engineering firms currently successfully offering PDA/signal matching services will face significant layoffs and a loss of available experience and expertise to benefit the FDOT's public works. Accordingly, as discussed above (§ I), this proposed change, as written, runs counter to the basic tenant of "fair and open competition" in Florida public procurement and opens future public procurements relying on the specification to contrary to competition challenges.

Finally, both internal and external gauge systems are available in the market; however, the specific EDC internal gauges system is patented and can only be provided by one commercial source. So, if the Agency does make a change to this subsection, the change should allow engineers and contractors the choice of which testing system to use on a project based on the requirements of the job. Giving engineers and contractors a choice on which system to use ensures that a proposed change provides level-field treatment to companies, permitting them to freely procure the appropriate system under the fair rules of open market competition, which in turn promotes technical and economic efficiency within FDOT and protects public interest. By giving engineers and contractors a choice, FDOT can avoid creating the appearance of and opportunity for favoritism; eroding public confidence that contracts are awarded equitably and economically; and causing the procurement process to be genuinely unfair or unreasonably exclusive.

#### **RECOMMENDATION:**

- Withdraw the proposed additional requirement that "[a]ll square prestressed concrete test piles will be monitored with an external gauge system with signal matching and an embedded gauge system concurrently."
- In the event the proposed change is not withdrawn, then modify proposed change by changing "and" to "or" and deleting "concurrently." This change would allow for fair and open competition from numerous firms competitively offering pile testing

services. The revised proposed change would read: “All square prestressed concrete test piles shall be monitored with an external or internal gauge system.”

- Change “embedded” to “internal”

### C. 455-5.14 Dynamic Load Tests

The Agency proposes to require installation of “embedded gauges” for all “square prestressed concrete test piles.” Specifically, the current provision provides:

*Either install internal gauges in the piles in accordance with Standard Plans, Index 455-003, or attach instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing.*

The Agency’s proposed change would read:

~~*Either install internal gauges in the piles in accordance with Standard Plans, Index 455-003, or attach*~~ **For all square prestressed concrete test piles, install embedded gauges in the piles** *in accordance with Standard Plans, Index 455-003 and attach external instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing.* **For other types of piles,** *either install embedded gauges in the piles in accordance with Standard Plans, Index 455-003, or attach external instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing.*

(emphasis added).

The proposed changes are objectionable on several accounts. First, there is no reason for dual monitoring of piles with both internal and external gauge systems concurrently. Testing a pile twice at the same time provides no additional benefit over testing it once by either system (both systems are considered equivalent in other parts of the specifications). There is a clear advantage to using external gauges because centrally located internal gauges cannot evaluate hammer-pile misalignment. Moreover, external sensors are reusable and changeable if/when needed (e.g., to avoid costly construction delays, as opposed to internal gauges that cannot be replaced in case of malfunction). External gauges can simply and quickly be attached to a pile while still on the ground, data can be transmitted wirelessly and analyzed on site. Embedding the testing gauges (EDC) inside the pile does not present a meaningful innovation or provides technical advancements to the state-of-the-art or practice of dynamic pile testing. The unnecessary additional expense of disposable gauges will erode public confidence that contracts are awarded equitably and economically. Thus, this additional requirement is both an unnecessary requirement and an unnecessary cost to taxpayers. Accordingly, this additional requirement fails to provide an adequate standard for FDOT’s decision and is arbitrary and capricious.

Second, this proposed addition applies only to certain square concrete piles and not to any other pile type. For example, EDC “embedded gauges” cannot be used on hollow cylindrical concrete piles, voided without solid top square concrete piles, steel pipe piles, steel H-piles, etc. The external gauges system can be used effectively, and has been successfully used

for decades worldwide, on all types of concrete, steel, timber, and composite piles. Considering what is technically sufficient for all other types of piles is also technically sufficient for square prestressed concrete piles, this proposed change is arbitrary and capricious.

Third, the proposed change patently favors one specific company over all others. Beyond the previous discussion identifying the proposed changes favoring one company (which apply here too), this proposed change does so egregiously. The proposed change requires procurement of specific EDC equipment from a single source commercial supplier, specifying the ***named index*** that shows the patented system of the supplier for embedded gauges. This will cause the procurement process to be genuinely unfair or unreasonably exclusive. Notably, and conversely, the proposed change does not provide such specificity or impose such limitations on external gauges. As a result, the proposed change does not simply create the appearance of and opportunity for favoritism, it expressly demonstrates favoritism towards the one sole-source supplier of embedded gauges. Accordingly, as discussed above (§ I), this proposed change runs counter to the basic tenant of “fair and open competition” in Florida public procurement and opens future public procurements relying on the specification to contrary to competition challenges.

#### **RECOMMENDATION:**

- Withdraw the proposed change.
- Alternatively, modify the proposed change to provide the option to use either system for square prestressed concrete piles. Specifically, the relevant portion of the proposed change would read: “For all square prestressed concrete test piles, install internal gauges in the piles or attach external instruments (strain transducers to measure force and accelerometers to measure acceleration) with bolts to the pile for dynamic testing.”
- Change “embedded” to “internal.”
- Remove reference to Index 455-003, or modify to make it generic to eliminate all implications of a specific provider’s equipment.

#### **D. 455-7.2 Manufacture**

Under 455-7.2, the Agency proposes to change the terminology from “internal gauges” to “embedded gauges” and add a requirement to install “top and tip embedded gauges” in all prestressed concrete piles. The current provision provides:

Fabricate piles in accordance with Section 450. When internal gauges will be used for dynamic load testing, supply and install in accordance with Standard Plans, Index 455-003. Ensure the internal-gauges are installed by personnel approved by the manufacturer.

See 455-7.2. The Agency proposes the following changes:

Fabricate piles in accordance with Section 450. ~~When internal gauges will be used for dynamic load testing,~~ Supply and install **top and tip embedded gauges** in all square prestressed concrete test piles and either top or top and tip, embedded gauges

in square prestressed concrete production piles monitored with an embedded gauge system, in accordance with Standard Plans, Index 455-003.

See 455-7.2 (proposed).

The proposed changes are objectionable for several reasons. First, the requirement to use “embedded gauges” effectively forces contractors to procure these items from a sole source provider, which runs contrary to “fair and open competition” in Florida public procurement and opens future public procurements relying on the specification to contrary to competition challenges. Moreover, this proposed change exponentially violates “fair and open competition” because it dictates that a specific set of patented equipment from a single source supplier must be exclusively used in an application where other suppliers could provide an equivalent or possibly better solution (in our experience, and as we heard from others, the EDC data/results are often-times inconsistent causing concerns about their reliability (e.g., tension stress location along pile length, unbalanced displacements at top and bottom, friction/bearing resistance contributions from blow to blow, etc.)). Accordingly, the proposed change goes beyond simply creating the appearance of and opportunity for favoritism, instead it expressly demonstrates favoritism, and causes the procurement process to be genuinely unfair or unreasonably exclusive.

Second, the additional requirement is not necessary. The proposed change to install top and tip embedded gauges is not needed technically because the widely used conventional external reusable gauges system provides equivalent information that the EDC system provides (as has been shown by FDOT comparison exercises). Accordingly, the proposed change is arbitrary and capricious for this reason alone.

Notably, for pile static load testing, the FDOT does not impose such a monopolistic requirement for procurement of gauges needed for testing.

In sum, this proposed change limits “open and fair competition” through forcing procurement from a sole source provider and is arbitrary and capricious because it is unnecessary and dictates a system that produces unreliable data.

- **RECOMMENDATION:** Withdraw the proposed change.
- Remove reference to Index 455-003, or modify it to make it generic to eliminate all implications of a specific provider’s equipment.

#### **IV. Conclusion**

For the reasons stated herein, we urge the Florida Department of Transportation to reconsider its proposed changes to Section 455 of the FDOT’s Standard Specifications for Road and Bridge Construction, and adopt the proposed recommendations provided above in their place. The FDOT is a custodian of the public interest and taxpayers’ money. Dwindling available public funds must be used efficiently and wisely. In my opinion (based on my Expert status certification in the field of dynamic pile testing and extensive involvement in the industry and on FDOT projects of all sizes and all pile types statewide for over 30 years), the proposed changes to the 455 standard specifications are misguided, wasteful, and unnecessary. They do not solve an existing problem, do not present any real qualitative innovation or technical advancement, do not benefit the FDOT, do not add to the well-being or safety of the public, and



are not in conformance with national specifications, guidelines and practices; they do stifle fairness, level-field, competition, and open-market public procurement of pile testing goods and services. The proposed changes clearly violate Florida law and we will seriously consider challenging these changes in state court in the event that the changes take effect.

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<sup>i</sup> See Standard Specifications for Road and Bridge Construction, Fla. Dept. of Transportation (July 2020), [https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/jul2020/7-20ebook.pdf?sfvrsn=c1f3424e\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/jul2020/7-20ebook.pdf?sfvrsn=c1f3424e_2) (accessed July 21, 2020).

<sup>ii</sup> See Memorandum, Fla. Dept. of Transp. (July 2, 2020) (Subj: Proposed Specification: SP4550000DB Structures Foundations (Design Build)) (“Proposed Design Build Specification”); Memorandum, Fla. Dept. of Transp. (July 2, 2020) (Subj: 4550512 Structures Foundations) (“Proposed SF Specification”).

<sup>iii</sup> Comments on SP4550000DB Structures Foundations (Design Build) submitted separately.

<sup>iv</sup> FDOT’s issuance of the Proposed Solicitation falls under Florida’s Administrative Procedure Act because the Proposed Solicitation is an “agency statement of general applicability that implements, interprets, or prescribes law or policy or describes the procedure or practice requirements of an agency and includes any form which imposes any requirement or solicits any information not specifically required by statute or by an existing rule.” Fla. Stat. §§ 120.52(16) (defining “Rule”); *see also* Fla. Stat. § 120.51 (terming Chapter 120 of the Florida Statutes as the “Administrative Procedure Act”).

<sup>v</sup> Future procurements using the Proposed Specification would also fall to arbitrary and capricious challenges for the same reasons the Proposed Specifications are arbitrary and capricious agency action discussed above. *See* Fla. Stat. § 120.57(3)(f).

<sup>vi</sup> See Memorandum, Fla. Dept. of Transp. (July 2, 2020) (Subj: 4550512 Structures Foundations) (“Proposed SF Specification”).

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**Response:**

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Comments: (7/30/20, Industry)

455-5.13.1 General: ... All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently. Comment: this will increase significant cost for pile dynamic testing for all projects having square prestressed concrete piles. I fail to see the benefits associated with this cost increase. It will likely double the coordination

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time to have two separate data collection systems on the same pile. It may cost delays to the construction because the limited number of EDC qualified testers.

**Response:**

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Comments: (7/30/20, Industry)

Proposed Specification: 4550512 Structures Foundations AND Proposed Specification: SP4550000DB Structures Foundations (Design-Build) We disagree with the proposed changes requiring that “All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently.” Redundancy, in this case, is not warranted. An external gauge system or an embedded gauge system will serve the intended purpose. Requiring both unnecessarily increases cost which is neither in the projects’ or the public interest. Engineers and Contractors can use EDC at their discretion. After all, EDC is not exactly new to the market and should be able to stand on its own merits, as do external gauges. If both systems are to be considered equivalent, or at least acceptable, then the market should be able to decide on a case by case basis. The FDOT should also consider that requiring EDC in every situation, they are not only unnecessarily increasing the cost, but assuring revenue to the sole entity that can conduct EDC. Certainly, if EDC is the independent, market driven choice of the users (engineers and contractors) then the sole entity will rightfully benefit, however, the FDOT should look closely at how the proposed unnecessary, but mandated, redundancy may usurp the market choices and, in the process, unfairly enrich a small group of companies owned by a single entity. Specification Section 455-5.18 We disagree with the proposed changes that “For foundation units where all piles are monitored using embedded data collectors, the foundation certification package may be prepared by the DTE, and the DTE may sign and seal revisions to the foundation layout and pile data table if the DTE is prequalified under the appropriate category in Florida Administrative Code (F.A.C.) 14-75.” Pile installation is considered an extension of the design process. The DTE has expertise in assessing the performance of individual piles, but the GFDEOR, as past of her/his design has considered the impacts of their complete foundation analysis. Unless one is knowledgeable of the process leading to the design, they cannot effectively assess potential changes during the construction process. Also, the DTE would be modifying a design that was not completed under her or his direct supervision. Any attempt to create a disconnect between the GFDEOR and the substructure construction in not in the best interest of the profession, or, more importantly, of public safety. Also, the FDOT should consider that this unnecessary and potentially disruptive change in current standards may unfairly enrich the EDC providers who are owned by a sole entity and for no beneficial reason. Specification Section 455-10.1 We disagree with the proposed change that “If the Dynamic Testing Engineer is also a CTQP qualified pile driving inspector, then an additional pile driving inspector is not required when driving piles using embedded data collectors”. The primary responsibility of the DTE is to monitor pile stresses, integrity and capacity. The observation of pile installation including production of the pile driving log, recording hammer blows, hammer stroke height, alignment etc. requires the full attention of the inspector as does the data collection process conducted by the DTE. The DTE cannot provide both functions within standard of care, and an attempt to do so would clearly impact pile integrity, project quality and above all, public safety.

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Response:

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Comments: (7/30/20, Industry)

Proposed Specification: 4550512 Structures Foundations AND Proposed Specification: SP4550000DB Structures Foundations (Design-Build) The proposed change requiring that “All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently” is unnecessarily redundant and does not serve any purpose. Using either an external gauge system or an embedded gauge system suffices, while using both adds additional cost to projects with no real benefit. If the intention is further study on EDC, that should be communicated to interested parties, however, further study does not seem warranted. EDC has had years to develop and should no longer be subsidized using FDOT funds. It has been on the market long enough for interested parties to determine it’s worth and whether they feel it’s use is beneficial to projects. If FDOT considers both systems to be considered equivalent from an engineering standpoint, Engineers and Contractors should be left to decide which is most suitable for projects on a case by case basis. Requiring EDC in every situation will not only increase the cost for no real benefit but assures revenue to the only company that can conduct EDC. There is no issue if EDC is chosen by the actual users (Engineers and Contractors) based on its merits. However, mandating it’s use in all projects where concrete piles will be tested will unfairly benefit the single entity that controls EDC. Specification Section 455-5.18 We disagree with the proposed changes that “For foundation units where all piles are monitored using embedded data collectors, the foundation certification package may be prepared by the DTE, and the DTE may sign and seal revisions to the foundation layout and pile data table if the DTE is prequalified under the appropriate category in Florida Administrative Code (F.A.C.) 14-75.” Pile installation is considered an extension of the design process. The DTE has expertise in assessing the performance of individual piles, but the GFDEOR, as part of their design has considered the impacts of their complete foundation analysis. Unless one is knowledgeable of the process leading to the design, they cannot effectively assess potential changes during the construction process. Also, the DTE would be modifying a design that was not completed under her or his direct supervision. Any attempt to create a disconnect between the GFDEOR and the substructure construction is not in the best interest of the profession, or, more importantly, of public safety. Also, the FDOT should consider that this unnecessary and potentially disruptive change in current standards may unfairly benefit the EDC providers who are owned by a sole entity and for no added benefit. Specification Section 455-10.1 The proposed change stating that “If the Dynamic Testing Engineer is also a CTQP qualified pile driving inspector, then an additional pile driving inspector is not required when driving piles using embedded data collectors” is not prudent. It is the responsibility of the DTE to monitor pile stresses, integrity and capacity during installation of the pile. The CTQP inspector’s responsibility is to record hammer blows, hammer stroke height, alignment, etc. which requires their full attention. The DTE cannot provide both functions and maintain the standard of care. An attempt to serve both functions would likely impact pile integrity, project quality and above all, public safety.

Response:

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No Name

Comments: (7/30/20, Industry)

The sole provider of EDC has embarked on an aggressive misleading marketing campaign of making people (including FDOT, contractors, engineers and practitioners, etc.) wrongly believe that internal/embedded data collector (EDC) gauges are more economical than using externally mounted instrumentation (PDA), when in fact is totally the opposite. Actually, their website states “This method demonstrates the soil-structure interaction and provides several options to the stakeholders resulting in ECONOMICAL AND ACCELERATED CONSTRUCTION.” Even though there aren’t too many recent projects to compare the cost of EDC vs. using externally mounted instrumentation (PDA), on the recently built 2.6-mile bridging project on Tamiami Trail which used 100% dynamic load testing with both type of instrumentation, the cost of using EDC gauges was almost double the COMBINED cost of using externally mounted instrumentation (PDA), CTQP inspector costs and Foundation Certifications. This is definitely a huge and unfair burden to taxpayers without any added benefit as the EDC technology is no replacement of externally mounted instrumentation (PDA) or engineering judgment. In fact, on a couple of on-going projects, there has been technical issues with the EDC that resulted in the use of externally mounted sensors, thus adding testing costs and construction time and hence contradicting sole provider of EDC own's website that EDC results in ECONOMICAL AND ACCELERATED CONSTRUCTION. When left to the market place to freely choose, EDC is rarely, if even chosen freely.

Response:

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Comments: (7/30/20, Industry)

I currently manage of the larger providers of Deep Foundation Testing and Evaluation in the State of Florida with a very large percentage of our work on FDOT projects. In general, FDOT specification changes in the past have been understood and justified from an Engineering perspective. This time I find the proposed change to be the opposite of that. I have been in this industry for more than twenty years and have never seen a change that hijacks the abilities of the Engineers and Inspectors. In this proposal the Dynamic Testing Engineer can trump the Geotechnical Design Engineer, t Structural Design Engineer, and Pile Driving Inspector. I am not sure the motivation behind this change or how this change is valuable to the integrity of the design and designers. Being a Dynamic Testing Engineer and now managing a group of 10 Dynamic Testing Engineers, I can assure you there are many factors of the design that need to be addressed outside the scope of our service. There is no part of Dynamic Testing that will evaluate lateral stability, overturning, global stability, uplift, ship impact studies, scour, project specific requirements, etc, which are all part of the design. In fact, the Design Engineers have minimum requirements of experience in order to provide their service. However, the Dynamic Testing Engineer without these requirements can trump the Engineer and accept the foundation. This change appears extremely reckless and dangerous. I believe there are many changes in the proposal that can be adopted, however, there are many that need to be dismissed and/or reworded. I propose that a review committee be provided which should include 1) The FDOT Engineers that work in Deep Foundations (Specifically the Geotechs), 2) Consulting Engineering Firms that specialize in Deep Foundation Testing and Evaluation on FDOT Projects and 3)

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Contractors that install Deep Foundation Systems. I would gladly be on such a committee to help rework this proposal to something more acceptable. I have some general comments about specific proposed changes that may not have been considered when it was being written. 455-5.5.13.1, 455-5.14, and 455-7.2 the proposal is recommending two types of dynamic monitoring. Based on my experience this additional data is just an additional cost as the additional data does not provide additional understanding. I would compare this to requiring two speedometers in a car. 455-5.19 the proposal recommends the DTE certify the foundations. Like stated above, having someone that specializes in Dynamic Testing certify foundations without experience in the pile design process and requirements is very dangerous. 455-10.1, the proposal recommends eliminating the pile inspector with the DTE. As a dynamic testing engineer, I strongly disagree with this, there are many things occurring during pile installation that the DTE would need to focus on and removing that focus would lead to loss of integrity in my opinion. As an example, during low blow count movement, I may need to be watching tension stress and letting the contractor know to lower the stroke, if the pile is moving at 5 to 10 blows per foot, the DTE would not be able to focus on hitting the footmarks every 10 seconds. In addition, I believe the inspector plays a larger role than understood, for example, the inspector documents the pile upon deliver, unloading, storing, pre-forming/drilling, jetting, template construction, standing of piles etc. all of these activities typically occur when the DTE is off site. Lastly, I feel this recommendation benefits one specific company more than all the others. As such, this puts the pile driving industry in Florida at the mercy of the one embedded data equipment manufacturer. In addition, the manufacturer is also the sole provider for monitoring the embedded gages, further requiring one company to participate in all pile driving projects, again putting the entire industry at one company.

**Response:**

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No Name

Comments: (7/30/20, Industry)

4550512 Structures Foundations AND Proposed Specification: SP4550000DB Structures Foundations (Design-Build) We disagree with the proposed changes requiring that “All square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently.” Redundancy, in this case, is not warranted. An external gauge system or an embedded gauge system will serve the intended purpose. Requiring both unnecessarily increases cost which is neither in the projects’ or the public interest. Engineers and Contractors can use EDC at their discretion. After all, EDC is not exactly new to the market and should be able to stand on its own merits, as do external gauges. If both systems are to be considered equivalent, or at least acceptable, then the market should be able to decide on a case by case basis. The FDOT should also consider that requiring EDC in every situation, they are not only unnecessarily increasing the cost, but assuring revenue to the sole entity that can conduct EDC. Certainly, if EDC is the independent, market driven choice of the users (engineers and contractors) then the sole entity will rightfully benefit, however, the FDOT should look closely at how the proposed unnecessary, but mandated, redundancy may usurp the market choices and, in the process, unfairly enrich a small group of companies owned by a single entity. Specification Section 455-5.18 We disagree with the proposed changes that “For foundation units where all piles are monitored using embedded data collectors, the foundation certification package may be prepared by the DTE, and the DTE may sign and seal revisions to the foundation layout and pile data table if the DTE is prequalified under the appropriate category in Florida Administrative

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Code (F.A.C.) 14-75.” Pile installation is considered an extension of the design process. The DTE has expertise in assessing the performance of individual piles, but the GFDEOR, as part of her/his design has considered the impacts of their complete foundation analysis. Unless one is knowledgeable of the process leading to the design, they cannot effectively assess potential changes during the construction process. Also, the DTE would be modifying a design that was not completed under her or his direct supervision. Any attempt to create a disconnect between the GFDEOR and the substructure construction is not in the best interest of the profession, or, more importantly, of public safety. Also, the FDOT should consider that this unnecessary and potentially disruptive change in current standards may unfairly enrich the EDC providers who are owned by a sole entity and for no beneficial reason. Specification Section 455-10.1 We disagree with the proposed change that “If the Dynamic Testing Engineer is also a CTQP qualified pile driving inspector, then an additional pile driving inspector is not required when driving piles using embedded data collectors”. The primary responsibility of the DTE is to monitor pile stresses, integrity and capacity. The observation of pile installation including production of the pile driving log, recording hammer blows, hammer stroke height, alignment etc. requires the full attention of the inspector as does the data collection process conducted by the DTE. The DTE cannot provide both functions within standard of care, and an attempt to do so would clearly impact pile integrity, project quality and above all, public safety.

**Response:**

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Comments: (7/30/20, Industry)

455-5.13.1 General - Is it really the intent of FDOT to give all test pile work to a sole source company, i.e. Radise? That will be the effect of the proposed change because EDC equipment is only available for installation by them. They will have personnel on site for EDC and can easily double dip to perform external instrumentation at greatly reduced cost to themselves. This effectively removes any competition for dynamic testing work. The EDC equipment has obtained limited penetration in the pile driving community for numerous reasons. It is expensive, it does not provide rigorous computation of pile capacity, it does not have extensive technical literature behind it, and it cannot be performed unless pre-installed. Capacity comparisons have been mostly with other dynamic tests, not static testing. Unlike external instrumentation, there is also no redundancy in the measurements, and there is no indication of misalignment or warning of miscalibration. The EDC company had basically failed for these reasons, and I don't understand why the FDOT is propping it up with taxpayer funds. Perhaps there should be some investigation of this process? It also seems wasteful and costly to include both external and internal instrumentation. In essence, EDC will become the only type of dynamic test performed by the FDOT if this requirement is approved. EDC is required but external testing is not. What is driving this change? External dynamic testing has a long, successful, international track record. Why are you killing it? 455-5.14 Dynamic Load Tests and 455-7.2 Manufacture – Same comments as above.

**Response:**

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No Name

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Comments: (7/30/20, Industry)

The Specification should not require two systems concurrently. Both systems provide similar information, therefore there is no added value nor cost savings. To the contrary, this is now “added cost” to the detriment of the taxpayer. Therefore, the following change is suggested: "All square prestressed concrete test piles shall be monitored with either an external gauge system with signal matching or an internal gauge system with signal matching. The internal gauge option, if selected, should come at no additional cost to the department."

Response:

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No Name

Comments: (7/30/20, Industry)

As a geotechnical PE with more than 20 years of experience, many of those years in Florida, I'm concerned about the proposed revisions of the specifications seems to place an unnecessary economic burden on the state finances at a time of economic hardship in the nation by requiring two separate systems to monitor test piles. It seems redundant and costly without added benefit to the public. The revisions seem to give preference to a technology that is single sourced.

Response:

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No Name

Comments: (7/30/20, Industry)

The proposed “455-5.13.1” is not justifiable technically and costly, or has any logical reason. The choice of which testing system to be used on any given project should be left up to the responsible design engineers and contractors based on the requirements of the job specification to ensure technical and economic efficiency to the FDOT and protect public interest. “Spec 455-7.2.” - Has no justifiable technical, economic, or rational reason. Again, how come embedded data collectors are so much needed to be required for square concrete piles only, while all other types of concrete piles and steel piles can be tested just fine without it. “Spec 455-7.2.” - Requiring Index 455-003 is biased and promotes the exclusive use of a specific patented system [may be offered by limited / a single source supplier], and excludes a fair and competitive open-market procurement process for public work projects. The proposed changes allow the Dynamic Testing Engineer [DTE] (only if testing with EDC system) to take on additional roles and responsibilities and replace the site CTQP Pile Inspector and certain functions of the GeoEOR, which is quite technically troublesome on how it will affect the proper pile installation work and Certification of the foundation unit; and is highly biased to the EDC provider/providers with DTE. Having worked in the geotechnical design industry for over 25+ years and being GeoEOR for major FDOT/FTE (250+) projects, the proposed changes to the 455 standard specifications do not solve an existing problem, do not benefit the FDOT and are misguided, uneconomical and unnecessary. Being not a provider of dynamic pile testing [with any methodology], there has been no issues with dynamic pile testers who for decades have been successfully using the external reusable gauges system. We believe that FDOT is a custodian of the public interest and taxpayers’ money and hence, available public funds must be used efficiently, economically and wisely.

Response:

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No Name

Comments: (7/30/20, Industry)

\* The proposed changes will require EDC and external gauges on all dynamic load tests. The FDOT has accumulated much information on the EDC technology during the past several years. The value of the technology should stand on it's own merit and use of EDC should not be mandated. Requiring both internal and external gauges is not wise stewardship of taxpayer funds.  
\* There is only 1 Firm who provides this proprietary technology for the gauges, software, data analysis, and licensing/cost. The FDOT has long avoided specifications that result in sole sourcing; these changes will result in exactly that and will eliminate competition (both pricing and technological) within the industry. \* It's also widely believed in the industry that the term "embedded data collector" is proprietary to 1 Company. The Department should avoid the term "embedded" in this specification and leave the verbiage "internal" as is. There is no downside to leaving the verbiage "internal" as is but an opportunity for price gouging if the specification mandates sole sourcing. \* The FDOT has long been a trusted agency with high integrity. Sole sourcing internal gauges would erode that trust.

Response:

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No Name

Comments: (7/30/20, Industry)

The proposed changes to the the FDOT 455 specifications seem to will be limiting the ability to have a competitive market for public work projects. The EDMC have a single approved source which holds the patent and the testing rights. This limits the opportunity for fair competitive pricing on publicly funded projects. There will also be an extreme financial impact on the current organizations that perform the external PDA procedure. With the single source internal organization onsite testing the internal, there would be no need for a secondary company to monitor the external PDA's. There is also an issue with the ability for the monitoring firm making modifications and approvals of the foundation packages. This has never been a practice allowed for the organizations performing the external monitoring.

Response:

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Comments: (7/30/20, Industry)

Daniel,

I tried multiple times to submit this on the web site and was taken to a site saying the website was experiencing difficulties. I'm not sure if it was submitted or not. My Comments regarding SP4550000DB and 4550512 are below. As I said, I tried multiple times to use the web site as instructed and was unable to successfully get my comments in. I believe the cut-off date is today so I wanted to make sure my comments were included.

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I am sure you have seen emails and comments from my competitors regarding the proposed changes to FDOT specifications (SP4550000DB and 4550512). I too am writing to you as a colleague who is also involved in driven piles and cares about the deep foundation industry. In fact, over 30 years ago, a current competitor taught me and my co-workers at the FDOT District 3 Materials office how to do dynamic testing. While I respect the knowledge and skill of my dynamic testing colleagues I would also like to point out that they are fierce competitors. That said, with regard to these proposed changes, I truly believe some of my competitors are putting their vested business interests in PDI equipment (the manufacturer of system that will be exclusively used by FDOT if these changes are not made) and PDI centric training above the interests of the taxpayers of the State of Florida.

Given that belief, I feel it's my obligation as an engineer to point out my thoughts. Before I continue and so that it is clear to my colleagues, I would like to point out that I currently also have a vested interest in seeing the FDOT make these changes as I am currently employed by Applied Foundation Testing which is now part of the Smart Infrastructure Group, the providers of the Smartpile System. That said, I also have been a believer in this system since the idea was first presented to me by Dr. Mike McVay and Dr. Sastry Putcha twenty years ago. After hearing their ideas, my first question was how can I help. I have been on this journey with them since then. Thinking back to that time, I remember Mike and Sastry presenting this as a method to improve the reliability of driven pile foundations while also improving safety, increasing productivity, and lowering costs. Since that time, some of my competitors have done everything they can to prevent the acceptance of the system. Nobody likes to have competition and it was evident to me that recognized what this project meant their business interests.

In general, the EDC system, if fully embraced by the industry offers significant improvements in safety, reliability, and productivity. It offers the possibility of getting CEI firms more involved in the testing by offering Pile Driving Inspectors the ability to take data while reducing the workload of the dynamic testing engineer. I can go through the benefits of the system, however, I believe most if not all of you are aware of them. The system is now at a point where Engineers need to become comfortable with the results the system provides. The only way this will happen is if the Department makes large scale adoption so that everyone can see what it can do.

My comments are as follows:

The change "all square prestressed concrete test piles will be monitored with an external gauge system and an embedded gauge system concurrently" will allow

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both the department and those engineers involved in deep foundation testing and inspection to gain deeper knowledge in the system (especially the merits of tip sensor data) on a large scale basis. As with all other test methods used by the FDOT, it takes some time and experience for engineers to develop this knowledge and for the industry as a whole to develop a sufficient base of trained engineers to use the method properly. This proposal also allows those consultants who have made a large investment in testing equipment and training from PDI to recoup their investments over the possible transition period. The comments that I have heard about this change are similar to the comments I heard over 30 years ago when the department switched over from the ENR formula to doing dynamic testing.

Similarly the “supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system” also will allow both the department and those engineers involved in deep foundation testing and inspection to gain deeper knowledge in the system (especially the merits of tip sensor data) on a large scale basis. As with all other test methods used by the FDOT, it takes some time to develop a sufficient base of trained engineers to use the method properly. This proposal also allows those consultants who have made a large investment in testing equipment and training from PDI to recoup their investments over the possible transition period.

“Supply and install top and tip embedded gauges in all square prestressed concrete test piles and either top or top and tip, embedded gauges in square prestressed concrete production piles monitored with an embedded gauge system, in accordance with Standard Plans, Index 455-003. Ensure the embedded gauges are installed by personnel approved by the manufacturer.” Not requiring Index 455-003 also promotes the exclusive use of a specific patented system offered by a single source supplier and excludes every other dynamic testing equipment manufacturer from participating in a fair and competitive open-market procurement process for public works.

The proposed changes allow the Dynamic Testing Engineer only if testing with the EDC system to take on the additional role of inspector reduces the costs associated with the system and offers the opportunity for increasing the role of site inspector. It does not remove any of the requirements for the design engineer. Dynamic testers will still have a role in assisting with the interpretation of the dynamic test data and providing recommendations on how the pile is to be driven.

The FDOT is a custodian of the public interest and taxpayers’ money. Dwindling available public funds must be used efficiently and wisely. In my opinion (based

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on my over thirty years of testing experience throughout the United States) the proposed changes to the 455 standard specifications are forward-thinking and necessary to increase production and reduce overall foundation costs. They solve existing problems with respect to safety and reliability, they benefit the FDOT and the industry as a whole and add to the well-being or safety of the public. They also increase fairness, level-field, competition, and open-market public procurement of pile testing service by giving a monopoly that has enjoyed this status throughout the US for over thirty years a competitor. This by increasing competition in this industry, the state, and the country as a whole should benefit from reduced costs, greater innovation, and overall improved testing reliability.

Best Regards,  
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