Florida Department of Transportation

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STRUCTURES DESIGN BULLETIN 20-02
ROADWAY DESIGN BULLETIN 20-06
MATERIALS BULLETIN 20-14
(FHWA Approved: April 22, 2020)

DATE: May 4, 2020

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Geotechnical Engineers, District Structures Design Engineers, District Maintenance Engineers, District Materials Engineers

FROM: Robert V. Robertson, P.E., State Structures Design Engineer
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SUBJECT: Embedded Data Collector (EDC) Policy Update

This bulletin updates ***Structures Design Guidelines*** Table 3.5.7-1, the ***FY 2020-21 Standard Plans, Index*** 455-003 and ***Soils and Foundations Handbook*** Appendix F with respect to the use of Embedded Data Collector (EDC) instrumented piles.

REQUIREMENTS

1. Replace Footnote (1) in ***Structures Design Guidelines*** Table 3.5.7-1 with the following:

   1. With signal matching analysis of PDA data or 'FDOT Method' analysis of EDC data of at least 10% of Piles in all Bents and Footings. Ensure all soil conditions encountered are analyzed. See Soils and Foundations Handbook.

2. ***Standard Plans, Index 455-003*** has been updated and is released as a ***Standard Plans Interim Revision*** (***IR455-003***) to the ***FY 2020-21 Standard Plans***. The Interim Revision will replace the original version of the Index published on October 30, 2019. Attach the Interim Revision to Contact Plans in accordance with the ***Structures Detailing Manual***, *Section 3.7*.

3. Replace ***Soils and Foundations Handbook*** Appendix F Item 2. with the following:

2. Embedded Data Collector (EDC) monitoring of Test Piles and Production Piles (100%)

In this method, dynamic load tests are performed on test piles and all production piles with the EDC system. Test piles may be driven first to determine production pile lengths. A resistance factor (ϕ) of 0.75 may be used with this method. No driving criteria are required because achieving the NBR without exceeding the allowable stress limits will be determined in the field by EDC monitoring in accordance with either **a.** or **b.** below.

a. EDC monitoring of all Test Piles and all Production Piles, using 100% tip and top gauges.

All EDC piles are monitored in the field using Smart Structures' UF Method. Smart Structures' FDOT Method post-processing software will be used to verify the UF Method results of at least 10% of piles in all bents and footings (minimum one per bent/group) including all test piles.

b. EDC monitoring of all Test Piles and all Production Piles, using a combination of top & tip gauges and top only gauges.

1. Use top and tip gauges in at least 10% of the piles (minimum one per bent/group) and top only gauges in the remaining piles. All test piles shall contain top and tip gauges.

2. In the field, use the UF Method during driving and confirm pile resistance with the FDOT Method after driving is complete for the piles instrumented with top and tip gauges. Use the Fixed Jc/Case Method for piles instrumented with top only gauges with back computed/selected Jc value (as described in the below points).

3. For the piles instrumented with top and tip gauges, review the FDOT Method results for at least the first 10 blows in the six inches of the drive qualifying the pile for acceptance, and use the Fixed Jc/Max Case equation to back compute the damping (Jc) value from the known FDOT Method capacity for the representative blow.

4. In the event the back computed Jc value using FDOT method appears to be out of an acceptable range (<0.1 or greater than 1.0), use the UF method capacity and good engineering judgment to determine Jc.

5. When more than one pile in a bent/group must be analyzed, select the highest Jc value of the analyzed piles for the bent/group and/or good engineering judgement to determine which production piles will be based on which Jc value.

6. When the need for set checks is anticipated, the Jc value for set check conditions will be higher than for initial driving. Therefore, the above procedure must be repeated on a set checked pile at the required set-up periods with top & tip gauges to determine the Jc value for set checking a top sensor only pile. When this is not possible, use prudent engineering judgement in consultation with and approval by the District Geotechnical Engineer.

BACKGROUND

These revisions should decrease costs for future projects utilizing EDC instrumented piles by providing a mechanism to reduce the quantity of piles with tip instrumentation and documenting how piles without tip instrumentation will be evaluated during construction.

IMPLEMENTATION

These requirements are effective on all design-bid-build projects with a letting on or after July 1, 2020.

These requirements are effective immediately on all design-build projects for which the final RFP has not been released. Design-build projects that have had the final RFP released are exempt from these requirements unless otherwise directed by the District.

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Attachments
Standard Plans Interim Revision, Index IR455-003

IR455-003