



## Florida Department of Transportation

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December 14, 2011

### MEMORANDUM

**TO:** All Users of the Florida Department of Transportation *Structures Manual*

**FROM:** Robert Robertson, State Structures Design Engineer

**COPIES:** Brian Blanchard, Assistant Secretary for Engineering and Operations; Duane Brautigam, Director, Office of Design; Assistant State Structures Design Engineers (Thomas Andres, Andre Pavlov, Dennis Golabek, Charles Boyd and Sam Fallaha); Larry Jones, State Geotechnical Engineer; Jeffrey Pouliotte, State Structures Maintenance Engineer; District Structures Design Engineers (Gerard Moliere, Rod Nelson, Keith Shores, Fred Ochoa, Neil Kenis, Jorge Rodriguez, Scott Arnold and Russ Snyder); District Structures Maintenance Engineers (James Jacobsen, Keith Campbell, Edward Gassman, John Danielsen, Ron Meade, Dennis Fernandez and Aran Lessard); Jeffery Ger, FHWA

**SUBJECT:** January 2012 *Structures Manual* (625-020-018)

The Florida Department of Transportation Structures Design Office has officially released the January 2012 *Structures Manual*. The *Structures Manual* can be found on the Structures Design Office website at: <http://www.dot.state.fl.us/Structures/StructuresManual/CurrentRelease/StructuresManual.shtm>

The *Structures Manual* is provided in PDF format and includes hyperlinks, bookmarks and search capabilities. The *Structures Manual* can be viewed online or it can be installed on your computer. To install the *Structures Manual* on your computer, click on the FDOT icon at the above website and follow the prompts to complete the installation. An icon (green for 2012) will be added to your Desktop which you may then click to launch the *Structures Manual*. If you already have the 2010 and or 2011 *Structures Manual* installed on your computer, installation of the 2012 *Structures Manual* will not overwrite it.

The *Structures Manual*, updated every January, is the primary source for FDOT structural design criteria. The design criteria found in the *Structures Manual* shall be incorporated on all future projects and on those projects currently being developed (i.e., when design and detailing have not already reached final stages). Submit design exceptions or variations in accordance with Chapter 23 of the *Plans Preparation Manual, Volume 1*.

For questions about the **Structures Manual**, or its application to a particular project, contact the appropriate District Structures Design Office.

To improve or further develop the **Structures Manual**, submit suggestions to Charles Boyd, Florida Department of Transportation, 605 Suwannee Street, MS 33, Tallahassee, Florida 32399-0450. ([e-mail charles.boyd@dot.state.fl.us](mailto:charles.boyd@dot.state.fl.us)).

## **Structures Manual January 2012 Revisions**

### **Structures Manual Introduction**

- I.2 .....Volume 6 requirements relocated to SDG and Specifications.
- I.6 .....Updated cross references.
- I.9.1 .....Revised definition of TAG group.
- I.10.3 .....Revised Manual revision process.

### **Volume 1 – Structures Design Guidelines**

Please note, the words "should" and "may" have been changed to the word "shall", and associated language has been changed to the active-imperative voice at numerous locations throughout the manual.

- 1.1.3 .....Deleted cross reference to Drainage Manual.
- 1.4.1 .....Deleted Paragraph B and renumbered subsequent Paragraphs.
- 1.4.2 .....Changed cover requirements for pedestals and expanded Figure 1.4.2- 5 to include pier caps. Revised footnote #2 in Table 1.4.2-1.
- 1.4.4 .....Relocated section from SDG 3.9 and expanded to include superstructures.
- 1.5 .....Added commentary to Paragraph A.
- 1.6 .....Revised entire section to include undercut expansion anchors.
- 1.9 .....Added new Section.
- 2.4 .....Added criteria for wind loads on beams, girders, trusses and arches; Added gust effect factor and pressure coefficient for sound barriers.
- 2.6.4 .....Added design speed requirement to Paragraph C.1.
- 2.6.8 .....Revised reference to vehicular collision force to reference LRFD instead of giving a specific value.
- 2.7.1 .....Deleted Paragraph E.
- 2.9 .....Expanded section.
- 2.10 .....Revised Redundancy Factors Table to differentiate between I-girders and box girders.
- 2.12 .....Deleted Paragraph D.
- 3 .....Added criteria for sound barriers.
- 3.1 .....Added Paragraph E.
- 3.3 .....Changed cross reference to HEC-23.
- 3.5.1 .....Revised Paragraph F.4 to address pedestrian bridges.
- 3.5.10 .....Modified Paragraph F per SDB C11-03.
- 3.5.12 .....Modified Table 3.5.12-1 per SDB C11-07.
- 3.6.1 .....Revised minimum drilled shaft size from 36 to 42 inches; Added commentary.
- 3.6.2 .....Reworded Paragraph C and added commentary.

- 3.6.3 ..... Revised uplift criteria in Table 3.6.3-1.
- 3.6.6 ..... Added Paragraphs F and G.
- 3.6.9 ..... Clarified Paragraph B.
- 3.9 ..... Moved to SDG 1.4.4.
- 3.10 ..... Clarified Paragraph A. Moved segmental box girder criteria from Paragraph E to SDG 4.6.8.C.
- 3.11 ..... Clarified Paragraph G; Added Paragraph Q and commentary and Paragraph R.
- 3.12 ..... Added cross references in footnotes of Table 3.12-1.
- 3.12.12 ..... New Section added per SDB C11-05.
- 3.13.1 ..... Revised Paragraphs C and Commentary.
- 3.13.2 ..... Corrected equation in Figure 3.13.2-3; Corrected cross reference in Figures 3.13.2-3 and 3.13.2-4; Clarified Paragraph J.1.c; Clarified Paragraph M requirements and added drilled shafts; Added Paragraph P per SDB C11-05.
- 3.14 ..... Revised entire section per SDB C11-08.
- 3.15.2 ..... Added second paragraph.
- 3.16 ..... Added new section.
- 4.1.3 ..... Expanded commentary in Paragraph C.
- 4.1.7 ..... Added new section per SDB C11-09.
- 4.1.8 ..... Added new section.
- 4.2.2 ..... Revised Paragraph A to reflect planing requirements in Specification 400. Deleted references to Inverted-T Beams in Paragraphs A and B. Added provision for pedestrian bridges and movable spans in Paragraph A. Deleted Paragraph C, added new paragraphs E and F and renumbered subsequent Paragraphs.
- 4.2.14 ..... Added new Section.
- 4.3.4 ..... Added provisions for spliced post-tensioned girders.
- 4.5.6 ..... Added requirements for length of end blocks.
- 4.5.8 ..... Added references to SDM Chapter 23 in Paragraph D and Commentary.
- 4.6.1 ..... Changed access door material from aluminum to steel; Added access envelope requirements in Paragraph C.4.
- 4.6.3 ..... Expanded Paragraph C requirements related to future PT. Deleted "previous practice" details. Added Figures 4.6.3-1 and 4.6.3-2.
- 4.6.6 ..... Deleted "previous practice" details and added Figure 4.6.6-1.
- 4.6.8 ..... Added Paragraph C.
- 4.7 ..... Added Paragraph B.
- 5.3.1 ..... Revised Paragraphs A and B and commentary.
- 5.6.2 ..... Changed access door material from aluminum to steel.
- 5.11 ..... Added provisions for field welding of sole plates to Paragraph A.
- 5.12.5 ..... Reworded section for clarity and added provisions for the use of galvanized A325 bolts on painted structural steel.
- 6.5 ..... Added paragraph G.
- 6.5.1 ..... Modified last sentence of Paragraph A per SDB C11-10; Added clarification regarding use of plain pads.
- 6.7 ..... Added references to MASH per SDB C11-02.
- 6.7.4 ..... Deleted reference to Structures Standards from Tables; Revised requirement for retrofitting traffic railings on post-tensioned slabs.
- 6.7.8 ..... Deleted section content; Added cross reference to PPM.

- 6.7.9 .....Relocated previous Section 6.7.9 Sidewalks to SDG 6.9; Added new Section per SDB C11-06.
- 6.8 .....Added requirement to show vertical displacements in the plans and added commentary.
- 6.9 .....New Section relocated and modified from old Section 6.7.9 Sidewalks.
- 7.1.1 .....Added references to LRFR in Paragraphs A and B. Deleted reference to LFR in Paragraph C. Revised Paragraph C.1. Revised Figure 7.1.1-1. Reworded Paragraph E.
- 7.3.6 .....Expanded requirement to include scour considerations.
- 7.3.7 .....Revised Paragraph C to reference to SDG 4.2.14.
- 7.6 .....Revised Paragraph A.3 and added Commentary.
- 8.7.17 .....Deleted cross reference to obsolete Standard.
- 9 .....Revised unit prices as noted.
- 10.3 .....Modified Paragraph B per SDB C11-07.
- 10.4 .....Modified entire Section per SDB C11-07.
- 10.6 .....Modified Paragraphs C and D per SDB C11-07.
- 10.7 .....Revised Paragraph C to refer to SDG Chapter 5. Modified Paragraph D per SDB C11-07.
- 10.18 .....Deleted Section 10.18 Proprietary Structures and renumbered subsequent Section per SDB C11-07.

## **Volume 2 – Structures Detailing Manual**

Please note, the words "should" and "may" have been changed to the word "shall", and associated language has been changed to the active-imperative voice at numerous locations throughout the manual.

- I.3 .....Added Paragraph C.
- I.5 .....Deleted "Bridge Key Sheet" and added PPM reference.
- 2.8 .....Relocated requirements from previous Sections 2.15 and 2.16 to Paragraphs E, F, G and H.
- 2.15 .....Relocated Previous Sections 2.15 Section Cut Line and Identification and 2.16 Enlarged Details to SDM 2.8. Renumbered subsequent sections.
- 3.8 .....Revised plan content requirements.
- 4.3 .....Clarified bar designations in Paragraphs C and E.
- 4.4 .....Revised Paragraphs A and B and Figures 4.4-1 and 4.4-2 to clarify Class 5 requirements and add anti-graffiti coating requirements; Added Figures 4.4-3 and 4.4-4.
- 5.2 .....Added second sentence to Paragraph E; Added profilograph note to F.2; Revised Paragraph F.3; Added approach slabs to table in Paragraph G.
- 5.3 .....Added direction to contact SDO/DSDO for guidance to Paragraph C.2. Added cross reference to SDG 5.9 in Paragraph C.3. Deleted last sentence of Paragraph D.2 and added Paragraph D.3.
- 6.3 .....Revised cross reference to HEC-23; Deleted sand-cement riprap requirement.
- 7.4 .....Added labeling requirements to Paragraph B.
- 11.5 .....Added requirements related to uplift; Added Figures 11.5-1 and 11.5-2.
- 12.5 .....Added Paragraphs E and H; Clarified Paragraph G.
- 12.6 .....Added bond breaker requirements to Paragraph E.
- 13.3 .....Deleted Paragraph C and renumbered subsequent paragraphs.
- 13.7 .....Revised Paragraph J to address skews. Added LRFD reference to Paragraph L.
- 13.10 .....Revised entire section.

- 13.11 ..... Revised entire section.
- 15.2 ..... Relocated Paragraph S to 15.3.Q.
- 15.3 ..... Added Paragraph Q.
- 15.8 ..... Clarified Paragraphs A, B and C and deleted last sentence of Paragraph B commentary; Modified Figures 15.8-4, 15.8-5, and 15.8-6; Added new Section C-C to Figure 15.8-5.
- 15.9 ..... Added new Figure 15.9-2 and renumbered subsequent figures.
- 16.5 ..... Added Paragraph G.2; Corrected cross references in Figure 16.5-1.
- 16.8 ..... Corrected cross reference note in Figure 16.8-1.
- 16.11 ..... Added Paragraph H; Added Figure 16.11-7.
- 17.2 ..... Changed "Slab" to "Deck casting" in Paragraph J.
- 19.6 ..... Relocated requirements of Paragraph B to J.1; Relocated Paragraph E to J.4; Added Paragraph N; Added Figure 19.6-5.
- 21.14.2 ..... Changed references from CES to Trns\*port; Added Paragraph D.
- 22.2 ..... Changed reference from scuppers to deck drains; Added Figures 22.2-2 and 22.2-3 and renumbered subsequent Figure; Added provisions for drainage on weathering steel bridges.
- 22.3 ..... Added reference to SDG 1.9.
- 22.3.1 ..... Revised drain pipe material options and added cross reference to SDG 1.9.
- 22.4 ..... Expanded requirements to include all retaining wall types; Deleted Figures 22.4-1 through 22.4-4; Added cross reference to Storm Drain Handbook.
- 23 ..... Added new Chapter and Detailing Manual Examples.

### **Volume 6 – QPL Acceptance Criteria**

Volume 6 requirements relocated to SDG and Specifications.

### **Volume 9 - FDOT Modifications to Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LTS-5)**

- 5.14 ..... Added new section and commentary.
- 5.15.1 ..... Revised wording for base plate weld type.
- 5.15.3 ..... Added new section and commentary.
- 7.5.1 ..... Changed cross reference to IDS and deleted reference to QPL.
- 11.5 ..... Added new section and commentary.
- 11.6 ..... Added cross reference to NCHRP report.
- 11.7.1 ..... Added requirement for evaluating overhead cantilevered structures.
- 11.9 ..... Added new section and commentary.
- 13.6.2.1 ..... Added minimum drilled shaft size. Revised commentary.