2014 Structures Related Design Standards Updates

Design Update Training

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Introduction:

- Guide to FDOT Publications
- Website navigation -specific to structures related Design Standards and their support documents.
- General Revisions
- Deleted Design Standards
- New Design Standards
- Significant Revisions to Structures Related Design Standards
- Drainage related Design Standards updates
- Looking Ahead
Guide to FDOT Publications

Speaking to the Designer:
- Structures Manual
- Plans Preparations Manual
- Basis of Estimates
- Instructions for Design Standards
- Design Bulletins
- Other design manuals such as Traffic Engineering, Drainage, Pavement, Soils and Foundations, etc.

Speaking to the Contractor/Manufacturer’s: Designers must be familiar with each of these components, but direction to, or information for designers are not (should not be) included in these documents.
- Design Standards
- Specifications
- Materials Manual
- Qualified Products

Speaking to the CEI:
- Construction Project Administration Manual (CPAM)
- Construction Memos
Instructions for Design Standards (IDS):
Provides specific instructions to assist the Design Engineer of Record in properly incorporating the associated Design Standards into the Contract Plans.

Design Standards:
Established to ensure uniform application of standard designs and details in the preparation of Contract Plans.

Developmental Design Standards (DDS): Design Standards that are in development and require approval for use; semi-experimental.

Website Navigation

Office of Design

Design Standards

INDUSTRY REVIEW
- Origination Form
- Instructions
- Example
- Current Submittals Under Review
- Submittal History

CURRENT

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<td>DSeB</td>
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Click on the Current eBooklet link “DSeB” for the most current Design Standards.

Thank you for visiting our site.

HISTORICAL

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Florida Department of Transportation Standards History

Design Standards Website:

http://www.dot.state.fl.us/rrdesign/DesignStandards/Standards.shtm
Support Documents include:

- **IDS**
- **Data Tables**
- **DGN’s (see Terms Of Use)**
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Support Documents for Structures Related Design Standards

Also available on the Structures Design Office website:

- MicroStation cell libraries; .pdf’s of Load Rating Tables (since not associated with a particular Design Standard);
- Structures Bar Menu cells.xml file (Data Tables pull-down menu update for FDOT2010 MR3 CADD Software download):
General Revisions

- Changed all **QPL** references to **APL**
  - On drawings, tables, cells, and in the **IDS**’s

- Updated **Structures Manual** references from Volume 9 to Volume 3.
  - On drawings, tables, cells, and **IDS**’s (14 Indexes)

- Updated Traffic Railing Index drawings to match the new 31” height of W-Beam Railings and updated the guardrail bolt locations to match. (**Indexes 420, 421, 422, 423, 425, & 477**)

- Added limitation to the **IDS** for all Traffic Railings limiting the number (**two**) and size (**2” dia.**) of conduits - to protect crashworthiness.
Deleted Standards

- **Index 199: Geotextile Criteria** Information moved to Specification Section 985
  - All references to *Index 199* changed to Specification Section 985.

- **Index 21900: Fender Systems- Polymeric Piles**
  - See *Structures Bulletin 12-11* and *SDG 3.14* for more information.
    - Effective date: January 2015
General Revisions - Cells

- Many of the Structures Cells were updated:
  - QPL to APL
  - Notes
  - General clean-ups (formatting, spelling, etc.)

- Other Cells with minor changes:
  - 11320: added missing columns “DF” & “FF”
  - 17743: added N-blowcount to soil criteria notes
  - 20005: Change some terminology & notes
  - 20510: Change bearing pads (for AASHTO Type II Beam)
  - LRFR_PCB: Deleted Service III check for FL120 permit

- New Cells added: 05250 & 21252: (2014 Revisions)
New Design Standard
Index 5250 - Perimeter Walls

TYPICAL ELEVATION
(T-Footing Shown, Trench Footing Similar)
New Design Standard Perimeter Walls (continued)

- Developed to assist Districts by providing a standard for visual barriers that meets the newly developed statewide policy for the use of Perimeter Walls.
  - See *Structures Bulletin 14-03 for more information.*
    - Contractor’s option to use precast concrete or masonry block construction.

- Archived *Developmental Design Standard Index D5250*
  - Simplified (reduced) the foundation options available for precast walls.
Updated **Specification Section 534** to include Perimeter Walls and specifications for masonry block and block construction.

- Removed *Developmental Specification Dev534*.

The following Manuals also have updates relating to the policies for use of Perimeter Walls:

- *Project Development and Environment (PD&E) Manual*,
- *Project Management Handbook*
- *Plans Preparation Manual (PPM), Volume 1, Chapter 32*
New Design Standard
Index 21252 - Access Door Assembly for Steel Box Sections

Released in Structures Bulletin 14-02
- 2014 Revisions

Photo taken at Tampa Steel Erection Co.
Significant Revisions

- **Index 480: Traffic Railing-(Vertical Face Retrofit) General Notes and Details**

  ✓ Changed “Skew” angle to match other details in the Structures Manual. Measure angle from a line drawn perpendicular to the centerline.

  Revised Drawing

  Prior to Revision
Significant Revisions

- **Indexes 852 & 862: Pedestrian/Bicycle Railings**
  - Clarified that sawcut joints in sidewalks (do not require 6” offset to the anchor bolts);
  - Corrected dimension for Type 1 - Special Height Bicycle Railing (SHBR);
  - **IDS** - Clarification added for Line of Sight, Sphere Rules and deleted information that is already covered in the *Structures Manual*.
Significant Revisions
Index 5200 Series - Noise Walls

- Deleted Fire Access Hole Details (*Indexes 5200, 5210 & 5211*)

**Diagram:**
- FIRE HOSE ACCESS HOLE TYPICAL DETAIL
- PLUG DETAIL

**Note:** Fire Hose Access Hole only to be located at or near fire hydrants.
Significant Revisions
Index 5200 - Noise Walls

- They’re ba-ack - with **more** revisions for 2015!

- General Notes have been updated and reorganized.

- Wall height is clarified as: the nominal wall height measured from finished grade (+ - 6 inches).
  
  - Wall height for the Tables is the wall height required for noise abatement.
  
  - Stacked panel height (constructed wall height) is the required wall height plus 1 foot.
  
  - Design includes the extra 1’-0” as exposed to wind loads (conservative).
Significant Revisions
Index 5200 - Noise Walls

- Tables of Variables divided into Two Tables (A & B)
  - Wind Speed Category (Table 1 = 110 mph, Table 2 = 130 mph & Table 3 = 150 mph)
  - Tables 3A & 3B have separate sections for 15’ post spacing
Significant Revisions: Junction Slabs

**Index 5210:** Traffic Railing/Noise Wall (8’-0”) Junction Slab

**Index 6110:** Wall Coping with Traffic Railing/Junction Slab

- Slope of junction slab can be varied to maintain required asphalt overlay thickness at the toe.

**NOTES:**

1. Match Cross Slope of Travel Lane or Shoulder.
2. Vary the Junction Slab slope based on the roadway cross slope to maintain a minimum 6” asphalt depth at the edge of the slab.
Significant Revisions: Junction Slabs

- Changed the Toe Details to clarify intent and improve constructability.
  - Minimum asphalt thickness of 6” extended a minimum of 6” beyond the toe.
Significant Revisions: Junction Slabs

- Slip forming of coping with junction slab is allowed
- Requires shop drawings.

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8. Angle varies ~ 0° min., 20° max.
9. **If slip forming is used, submit shop drawings for approval showing 3” side cover with the Typical Section dimensions adjusted.**
Significant Revisions: Junction Slabs

- Slip Forming:
Significant Revisions

- **Index 6011: Gravity Walls**
- **Was:** C-I-P Gravity Walls
  - Precast walls are now permitted
  - Added Toe Slope minimum dimensions based on global stability analysis;
  - Ignore cross reference to SBW Details on “Sheet 2”.

![Diagram of Gravity Wall Design](image-url)
Developmental Design
Standard Index D6011
(Gravity Segmental Block Walls)
Significant Revisions

◆ **Index 6020: Permanent MSE Retaining Wall Systems**
  ✓ Removed redundant notes (Notes in the Specifications, **IDS**, or **SDG**). Updated **IDS**

◆ **Index 6200: Coping Mounted Light Pole Pedestal**
  ✓ May now be either C-I-P or Precast.

◆ **IDS 6025: GRS-IBS**
  ✓ Added requirement for EOR to detail the rip-rap rubble in the Plans.
Significant Revisions

- **Index 20010: Typical Florida-I Beam Details and Notes**
  - Changed the bottom flange chamfer dimensions for CASE 2 & 3
  - Changed top flange clip dimension for CASE 1

- **Index 20120: AASHTO Type II Beam**
  - Deleted top flange clip from CASE 1
Significant Revisions

- **Index 20510: Composite Elastomeric Bearing Pads**
  - Optimized bearing pads for AASHTO Type II Beams
  - Named new pads AA and AB;

- **Index 20511: Bearing Plates (Type 1)**
  - Removed exception for Type A & C Bearing Pads – see Index 20510 updates
  - Changed corner clips – see Index 20010 & 20120 updates
  - Rearranged Drawings and clarified Notes
Significant Revisions

- **Index 20512: Bearing Plates (Type 2)**
  - Removed exception for Type A & C Bearing Pads – see Index 20510 updates
  - Corrected dimensions to holes and studs for AASHTO Type II’s
  - Rearranged Drawings and clarified Notes.
**Significant Revisions**

- **Index 20900 and 20910: Approach Slabs**
  - Changed Base under the Approach Slabs from “Optional Base Group 2” to “Optional Base (See Note 7)”.
    - “See the Roadway Plans for asphalt overlay and optional base details.”
  - Moved the asphalt information from Index 20900 into the IDS.
  - Added instructions to the IDS for the Optional Base.

**IDS:**

1. **In the Roadway Plans:**
   - Include details and payment for the optional base under the approach slab. The minimum structural requirement under the approach slab is Optional Base Group 2. If the optional base group for the roadway approaches is Group 2 or better, the same base group may be continued under the approach slab.
Significant Revisions

- **Index 21930: Fender System – Concrete Pile**
  - Changed “Clearance Gauge and Light” Note:
    - Contractor to supply Clearance Gauge sign panel;
  - Clarified convention in “Plastic Lumber and Structural Composite Lumber Wales” Note.

- **Index 21900: Fender System – Deleted.** *(Contractor designed FRP pile fender systems are coming.)*
Index 21250 & 21251
- Access Hatch Assemblies
Significant Revisions
Access Hatch Assemblies (continued)

- Redesigned lock release at the request of the Districts and Bridge Maintenance.
  - Hatch assemblies can be opened from the exterior and/or interior of the box sections.
Drainage Related Standard Updates

- **Index 200:** *Structures Bottoms Type J and P*
  - Clarification of reinforcing bars above pipe blockouts

- **Index 206:** *Closed Flume Inlet*
  - Increased cover over reinforcing bars

- **Index 253:** *Straight Concrete Endwalls - Single and Double 72” Pipe*
  - Corrected drawing to show reinforcing between pipe openings
Drainage Related Standard Updates

- **Index 289: Concrete Box Culvert**
  - Updated the *IDS*
    - Joint openings with Type II Extensions
    - Deleted commentary
Looking Ahead

- **Fiber Reinforced Polymer (FRP) Standards:**
  - DDS Index D21310 – FRP Bar Bending Details
  - Developmental FRP Specifications
  - Future Developmental Standards

- **Other Developmental Design Standards:**
  - Index D6011 – Segmental Block Gravity Wall
  - Index D420 – Precast 32”-F Shape Traffic Railing
  - Index D206XX – Precast Bent Cap Details
Looking Ahead

◆ Fiber Reinforced Polymer (FRP) Standards (cont.):

✓ **DDS Index D21310** – FRP Bar Bending Details
  - includes commonly used types, shapes and configurations of straight and bent pultruded reinforcing Fiber-Reinforced Polymer (FRP) reinforcing bars.

  - The bar bend types and properties are limited and cannot be field formed or modified

  - shapes must be obtained utilizing splices
Looking Ahead

- Fiber Reinforced Polymer (FRP) Standards (cont.):
  - DDS Index D21310 Cont. – FRP Bar Bending Details
    - Design Aids in the **IDS** contain examples of typical composite shapes.
Looking Ahead

◆ Fiber Reinforced Polymer (FRP) Standards (cont.):

✓ Developmental FRP Specification (published)

- Construction Specifications:
  - Dev 400: Concrete Structures
  - Dev 410: Precast Concrete Box Culverts
  - Dev 415: Reinforcing for Concrete
  - Dev 450: Precast Prestressed Concrete Construction

- Material Specifications:
  - Dev. 933: Nonmetallic Accessory Materials for Concrete Pavement and Concrete Structures. (Glass-FRP & Carbon-FRP)
  - Dev 933: Prestressing Strand (Carbon-FRP)
Looking Ahead

Fiber Reinforced Polymer (FRP) Standards:

Future Developmental Standards

- CFRP Square Prestressed Concrete Piles
  - Use of standard strand patterns
- Concrete Sheet Piles
  - Combination of CFRP strand and GFRP spirals.
Design Standards Information:

- The **Design Standards** and their accompanying instructions, **IDS's** are updated annually in July for implementation on January 1st of the following year,
  - AND as needed between the annual updates as a **DSR- Design Standard Revision**.

- The Structures Standards Group strives to implement updates from the associated Design Specifications (**AASHTO** and **SDG**) into the **Design Standards** when applicable, **AASHTO** within a year of adoption by **FDOT**.

- Please contact us when you find errors or think of possible improvements; we work on the **Design Standards** all year round.
Message from the Structures Standards Group

- We are here to assist you with your questions and concerns. Please contact us:
  - If you have a suggestion:
    - for a new standard or
    - for an improvement to an existing standard.
  - If you have any issues during design or construction:
    - Fully explain the issue (photos help);
    - Provide suggestions (if you have any) and;
    - Any documentation that might support a proposed change and assist us during development.
  - Anytime you have questions or concerns *(but, please read the IDS first before contacting us).*