FLORIDA DEPARTMENT OF TRANSPORTATION

FDOT STRUCTURES MANUAL

Volume 1 - Structures Design Guidelines

Volume 2 - Structures Detailing Manual

Volume 3 - Instructions for Structures Related Design Standards (External Link)

Volume 4 - Structures Standard Drawings (External Link)

Volume 5 - LRFD Design Examples (External Link)

Volume 6 - QPL Acceptance Criteria

Volume 7 - Reserved for future use

Volume 8 - Modifications to LRFR

Volume 9 - Modifications to LTS-5

Frequently Asked Questions

Archived Structures Manuals

2010 Revision History

Structures Design

Florida's Transportation Engineers

INTRODUCTION

I.1 GENERAL

This ***Manual***, (FDOT Procedure # 625-020-018) provides engineering and detailing standards, criteria, and guidelines to designers and detailers who design structures for the Florida Department of Transportation.

The "***Structures Manual***" is provided in PDF format, both as individual chapters, and as complete volumes. The manual is accessible via the Structures FDOT Internet Website. Links to resources outside of the control of the FDOT Structures Design Office access the default web page of the host site.

Please note that while it is possible for those with PDF editing software to download and modify the ***Structures Manual*** PDF, the only recognized official version shall be the document that is provided on the FDOT Internet Website.

I.2 CONTENTS

Volume 1 - Structures Design Guidelines

The ***Structures Design Guidelines***, (***SDG***) incorporate technical design criteria and includes additions, deletions, or modifications to the requirements of the ***AASHTO LRFD Bridge Design Specifications*** (***LRFD***).

The ***SDG*** provides engineering standards, criteria, and guidelines for developing and designing bridges and retaining walls for which the Structures Design Office (SDO) and District Structures Design Offices (DSDO) have overall responsibility.

Volume 2 - Structures Detailing Manual

The ***Structures Detailing Manual*** (***SDM***) provides guidance for drafting and detailing criteria and methods used in preparing Florida Department of Transportation (FDOT) contract plans for structural elements or systems. These elements or systems include bridges, overhead sign structures, earth retaining structures and miscellaneous highway structures. The ***SDM*** includes preferred details and examples of general component plan sheets.

Volume 3 - Instructions for Structures Related Design Standards (External Link)

The ***Instructions for Structures Related Design Standards*** provides general instructions to assist the Design Engineer of Record when incorporating these ***Design Standards*** in the Contract Plans. Instructions including design criteria, usage limitations, plan content requirements, pay item information and in some cases examples and sample drawings are provided for bridge component, overhead sign structure, box culvert and mast arm standards.

Volume 4 - Structures Standard Drawings (External Link)

Structures Design Office Standard Drawings provided in MicroStation DGN and PDF format.

Volume 5 - LRFD Design Examples (External Link)

LRFD Bridge Design examples are provided in PDF format and links to Internet downloadable interactive Mathcad Workbook format.

Volume 6 - QPL Acceptance Criteria

Criteria for evaluating products for approval and use by the Florida Department of Transportation

Volume 7 - Reserved for future use

Volume 8 - Modifications to LRFR

Modifications to the "***Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges***"

Volume 9 - Modifications to LTS-5

Modifications to the "***Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (LTS-5)***"

I.3 AUTHORITY

Section 334.048(3) and 20.23(3)(a), Florida Statutes (F.S.)

I.4 SCOPE

The use of the ***Structures Manual*** is required of anyone performing structural design or analysis for the Florida Department of Transportation.

I.5 ABBREVIATIONS

ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AREMA	American Railway Engineering and Maintenance-of-Way Association
AWS	American Welding Society
DSDE	District Structures Design Engineer
DSDO	District Structures Design Office
DSME	District Structures Maintenance Engineer
DSMO	District Structures Maintenance Office
FHWA	Federal Highway Administration
FDOT	Florida Department of Transportation
LRFD	Load and Resistance Factor Design
PPM	Plans Preparation Manual
SDG	Structures Design Guidelines
SDM	Structures Detailing Manual
SDO	Structures Design Office
SSDE	State Structures Design Engineer
SSPC	Steel Structures Painting Council
TAG	Technical Advisory Group
SDB	Structures Design Bulletin

I.6 REFERENCES

A. Except where modified in this ***Manual***, conform to the requirements of the specifications, codes, manuals and design requirements referenced in this section.

B. AASHTO Publications

1. AASHTO/AWS D1.5M/D1.5-2008 Bridge Welding Code
2. Construction Handbook for Bridge Temporary Works, 1st Edition (1995) with 2008 interims
3. Guide Design Specifications for Bridge Temporary Works, 1st Edition (1995) with 2008 interims
4. Guide Specifications for Structural Design of Sound Barriers (1989) with 1992 and 2002 interims
5. Guide Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges (2003) with 2005 interim
6. LRFD Bridge Design Specifications, 4th Edition (2007) with 2009 Interims
7. LRFD Movable Highway Bridge Design Specifications, 2nd Edition (2007) with 2008 Interims
8. Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 5th Edition (2009)
9. Guide Specifications for Bridges Vulnerable to Coastal Storms (2008)

C. FDOT Publications (latest editions)

1. Plans Preparation Manual, Volume 1(Topic No.: 625-000-007)
2. Plans Preparation Manual, Volume 2(Topic No.: 625-000-008)
3. Drainage Manual (Topic No.: 625-040-001)
4. Design Standards with latest Design Standards Modifications (Topic No.: 625-010-003)
5. CADD Production Criteria Handbook
6. FDOT Standard Specifications for Road and Bridge Construction
7. Bridge Load Rating, Permitting and Posting Manual (Topic No: 850-010-035)
8. Soils and Foundation Handbook

D. Other Publications

1. AISC Steel Construction Manual - Thirteenth Edition
2. FHWA-NHI-00-043 Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Design and Construction Guidelines
3. AREMA Manual for Railway Engineering
4. Code of Federal Regulations 23 CFR 635.410

I.7 COORDINATION

Coordinate all plans production activities and requirements between the ***Structures Manual***, ***PPM*** and ***LRFD***. Each of these documents has criteria pertaining to bridge or structures design projects, and, normally, all must be consulted to assure proper completion of a project for the Department.

Direct all questions concerning the applicability or requirements of any of these or other referenced documents to the appropriate Structures Design Engineer.

I.8 DISTRIBUTION

This ***Structures Manual*** is furnished via the SDO web page at no charge. The user must regularly check for additions, modifications and bulletins. Address questions regarding this ***Manual*** and any modifications to:

Florida Department of Transportation
Structures Design Office
Mail Station 33
Attn: Structures Manual Editor
605 Suwannee Street
Tallahassee, Florida 32399-0450
Tel.: (850) 414-4255
http://www.dot.state.fl.us/structures

I.9 ADMINISTRATIVE MANAGEMENT

Administrative Management of the ***Structures Manual*** is a cooperative effort of SDO staff and the nine voting members of the Technical Advisory Group (TAG).

I.9.1 The Technical Advisory Group (TAG)

The TAG provides overall guidance and direction for the ***Structures Manual*** and has the final word on all proposed modifications. The TAG comprises the State Structures Design Engineer (SSDE) and the eight District Structures Design Engineers (DSDE). In matters of technical direction or administrative policy, when unanimity cannot be obtained, each DSDE has one vote, the SSDE has two votes, and the majority rules.

I.9.2 SDO Staff

SDO Staff comprises the Assistant State Structures Design Engineers and Senior Structures Design Engineers selected by the SSDE.

I.10 MODIFICATIONS

Modifications may be the result of changes in FDOT specifications, FDOT organization, Federal Highway Administration (FHWA) regulations, and AASHTO requirements; or occur from recent experience gained during construction, through maintenance, and research.

Structures Manual users are encouraged to suggest modifications and improvements such as design procedures, text clarity, technical data, or commentary. Address questions regarding this ***Manual*** and any proposed modifications to the Structures Design Office contact listed in Section I.8 above.

I.10.1 Adoption of Revisions

Structures Manual revisions are issued by the SDO as ***Structures Design Bulletins*** (***SDBs***) or Permanent Revisions following a formal adoption process.

I.10.2 Structures Design Bulletins

A. ***SDBs*** are mandatory, supersede the current ***Structures Manual***, and will be issued when the SSDE deems a change essential to production or structural integrity issues and in need of immediate implementation. ***SDBs*** may address issues in plans production, safety, structural design methodology, critical code changes, or new specification requirements.

B. ***SDBs*** are effective for up to 360 calendar days unless superseded by subsequent ***SDBs*** or Permanent Revisions to the ***Structures Manual***. ***SDBs*** automatically become proposed Permanent Revisions unless withdrawn from consideration by the SSDE.

C. ***SDBs*** indicate their effective date of issuance and are numbered sequentially with reference to the year of issuance and version number. For example, ***Structures Design Bulletin No. 10-2*** would be the second ***Bulletin*** issued in 2010.

D. ***SDBs*** may be proposed by any DSDE, DSME or PE in the ***SDO*** for consideration by the SSDE. The author must research all affected FDOT policies, criteria and specifications. Proposed ***SDBs*** must be submitted to one of the Assistant SSDEs for review, comment and concurrence. If the Assistant SSDE concurs with the proposal, it will be sent to the SSDE for consideration, final approval and publication on the SDO's website.

E. ***SDBs*** that significantly affect other offices must be composed with the assistance of the affected office. ***SDBs*** that significantly affect construction will be issued as a ***Joint Bulletin*** with the State Construction Office (coordinate with the State Construction Office on the proper Construction ***Bulletin*** number).

F. Proposed ***SDBs*** must be formatted to include Requirements, Commentary, Background, Implementation and Contact sections:

1. Requirements: This section codifies exceptions, revisions and/or additions to policies or criteria as specified in current adopted specifications (i.e. ***Structures Manual***, ***AASHTO LRFD Bridge Design Specifications***, etc.). Requirements must reference the specific section) in the ***Structures Manual*** or other documents where they are to be incorporated. Revisions to the Department's ***Standard Specifications*** will be handled through the Specifications Office.

2. Commentary: This section provides the essential technical support behind the new requirement and is intended to be brief. It includes references to the literature, both pro and con, that influenced the decision. This information will not be included in the ***Structures Manual***, ***Plans Preparation Manual***, etc. Include commentary that needs to be included in the ***Structures Manual***, ***Plans Preparation Manual***, etc. in the requirements section of the ***SDB*** in italics.

3. Background: This section discusses the circumstances that prompted the ***SDB***. It should not duplicate the Commentary but simply facilitate the reader's understanding of situations that occurred and the SDO's response to them. Include background information including history of a practice, problem issues, references, sources of information, etc. This information will not be included in the ***Structures Manual***, ***Plans Preparation Manual***, etc.

4. Implementation: This section specifies the timeline upon which the requirements are to be implemented. Factors to be considered in the implementation plan include funding sources to implement changes to existing design and construction contracts, effect on adopted work program, etc. Implementation plans typically include effective, publishing and letting dates for the Requirements.

5. Contact: Although the SSDE is the responsible author of all ***SDBs***, this section lists the ***SDB's*** champion who will also be the key contact person for questions and comments related to the ***SDB***. This section lists the ***SDB's*** key contact name, title, work telephone number and email address.

I.10.3 Permanent Revisions

Permanent Revisions to the ***Manual*** are made annually or "as-needed." If the SDO considers an individual revision, or an accumulation of revisions, to be substantive, the ***Manual*** may be completely rewritten. The following steps are required for adoption of a revision.

A. SDO Staff will assess proposed revisions and develop the initial draft for the SSDE's approval.

B. The SDO Staff will conduct the necessary research, coordinate the proposed modification with all other affected offices and, if the proposed modification is deemed appropriate, prepare a complete, written modification with any needed commentary. The SSDE's approval signifies the SDO's position on the proposed modifications.

C. Proposed modifications will be transmitted to TAG members and others allowing for no less than two weeks review time before the next scheduled TAG meeting. Other parties include, but are not limited to: State Construction Office, State Maintenance Office, State Materials Office, State Roadway Design Office, Forms and Procedures Office, and FHWA. DSDE members of TAG will coordinate the proposed modifications with all other appropriate offices at the district level.

D. Each TAG member will review proposed modifications before the meeting where they will be brought forward for discussion. The SDO will review all modification comments received from other FDOT/FHWA offices in preparation for presentation at the meeting. Additional review comments received by the SDO and/or DSDO's during the review process will be presented for discussion and resolution.

E. Immediately after the TAG meeting, each proposed modification will be returned to the SDO with one of the following recommendations:

   1. Recommended for adoption as presented.
   2. Recommended for adoption with resolution of specific changes.
   3. Not recommended for adoption.

F. Within two weeks after the TAG meeting, the SDO Staff will resolve each recommended modification and the assembled modifications will be provided to the SSDE for final approval.

G. Once approved by the SSDE, the ***SDG*** revision modifications will be assigned to the Special Projects Group Leader for final editing.

H. Unless agreed otherwise, the ***SDG*** version modifications will be distributed within 4 weeks after receipt of the approved modifications from the SSDE. This period allows the Forms and Procedures Office to update the ***Standard Operating System, Procedure No. 025-020-002*** and any electronic media before electronic distribution of the ***Structures Manual***.

I.11 TRAINING

No specific training is necessary for the use of this ***Manual***. Major revisions are often presented and discussed at conferences and annual ***PPM*** update training.