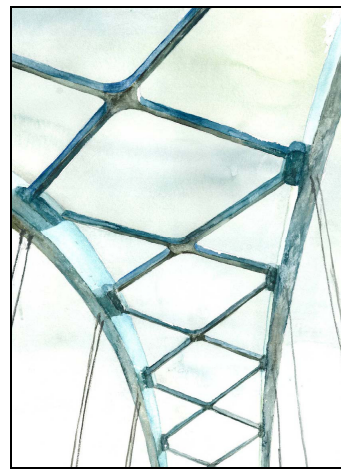




Division of Transportation  
System Development  
Bureau of Structures  
PO Box 7916  
Madison, WI 53707-7916



**Bridge Manual**



**Standard Details**

DATE: January 30<sup>th</sup>, 2013  
TO: Bridge Manual Users  
FROM: DTSD – Bureau of Structures  
SUBJECT: **January, 2013 Bridge Manual Update**

The Bridge Manual revisions to text and standards are now complete and posted online for this six month cycle. Please see the attached sheets for a list, with brief explanation, of the Text and Standards that were revised. Corresponding plan insert sheets have also been updated and posted online.

Of particular interest in this edition:

- **Chapter 4** – Entire aesthetics chapter was updated to provide further guidance regarding bridge structure aesthetics in Wisconsin. The previous iteration of this chapter contained ambiguities and did not provide tangible guidance pertaining to the process to be employed on WisDOT projects. This chapter will continue to expand in subsequent Bridge Manual Updates. **Note:** *An interim policy on the use of aesthetic barriers on bridges has been developed and has been attached at the end of this document.*
- **Chapter 7** – Updated section 7.1.4.2 regarding Geosynthetic Reinforced Soil - Integrated Bridge System technology. Two new standards were assembled for use with GRS-IBS structures (Standards 7.01 and 7.02) and an SPV is available for use on WisDOT projects.
- **New Standard 7.01 – GRS Abutments General Plan:** Details for GRS abutments when used on Accelerated Bridge Construction projects.
- **New Standard 7.02 – GRS Abutments Details:** Additional details to go along with Standard 7.01.
- **Chapter 11** – Clarified WisDOT Policy Item regarding redundancy and resistance factor adjustments for the Strength Limit State based on the number columns in a bent being supported by one drilled shaft.

- **Standard 14.04** – Updated notes regarding which bid items are to contain size 2 coarse aggregate and eye bolts for safety attachments. Provided guidance under Designer Notes regarding the placement of slope paving concrete on bridge plans in lieu of MSE retaining wall plans.
- **Chapter 19** – Revised text to show the two compressive stress checks required for Service I and added the compressive stress check for Fatigue I. AASHTO moved one of the stress limits from Table 5.9.4.2-1 and placed it in Article 5.5.3.1 as a compressive stress limit under fatigue loading.
- **Chapter 27** – Updated section 27.2.2.3 heading to High-Load Multi-Rotational Bearings to allow for disc-type bearings to be used in addition to pot-type bearings. Updated text accordingly and added typical bearing figures. An SPV is available for use on WisDOT projects.
- **New Standard 36.07 – Pipe Opening in Culvert Wall:** This Standard was developed in order to follow guidance from ACI regarding placing reinforcement around openings in concrete walls. Additional trim bars (vertical bars replacing those that are interrupted by the opening), opening bars (horizontal bars replacing those that are interrupted by the opening), and corner bars (bars placed on a diagonal at each corner) are to be provided.

Most other changes are fairly minor. Please use the example calculations with care (follow along in AASHTO). A couple of mistakes have been pointed out. Unfortunately, due to time/resource issues, the corrections were not made at this time.

If anything in a given chapter was edited, the date for the entire chapter was updated. A vertical black bar in the left margin notes all changes. Previous black bars were not removed from chapters which were not edited in this update.

The user's feedback regarding the Bridge Manual is important to us as that is where we get many ideas for corrections, clarification and new ideas for enhancement.



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**January 30<sup>th</sup>, 2013**

Distribution: Users of Wisconsin Department of Transportation Bridge Manual

RE: Interim Policy on the use of Aesthetic Barriers on Bridges

There is an increased frequency of the use of vehicle Barrier and Railing combinations on structures in Wisconsin that incorporates new and unique aesthetic details. There is also more information now available that addresses the Safety and Crash Worthiness of vehicle barriers (AASHTO Roadside Design Guide 4<sup>th</sup> addition - 2011, Manual for Assessing Safety Hardware- 2009, NCHRP Report 554, and other publications).

As the application of these new vehicle barrier are under consideration, design, and review, it is apparent that new policies need to be developed and applied to projects to promote safe vehicle barrier systems that are consistent with the improved understanding of desirable safety features as outlined in the updated testing and publications. The development of these new policies will require interpretation of the information from various documents relevant to the types of barrier and rail systems used in Wisconsin. Input from a number of stake holders including FHWA, The Department's Bureau of Project Development - Roadway Standards & Methods Section, Bureau of Structures - Development Section, and various research institutions will be required to interpret the documents and build consensus on emerging policies. This process will be ongoing and dependent on the release of new information and the process of policy development.

However, there is a clear need to define an interim policy that will aid in the development of projects currently underway. Therefore, The Bureau of Structures Development Section is issuing the following Interim Policy related to Concrete Barriers on Bridges.

Interim Policy related to Concrete Barriers and Aesthetics:

- All Concrete Vehicle Barriers must meet Crash Testing Guidelines as outlined in Chapter 30 of the Bridge Manual.
- The top surface of Concrete Vehicle Barriers must be continuous without raised features that can serve as a blunt end for impact or snag points for vehicles.
- For vehicle barriers on raised sidewalks with posted roadway speed of 40 MPH or lower, any raised feature (Pilasters or other) must be placed a minimum of one foot (1'-0") behind the front face (roadway side) of a vertical faced barrier. If a railing is placed on the top of the concrete barrier, the railing should be continuous along the length of the barrier eliminating snag points for vehicles.

- For vehicle barriers on high speed roadway (posted greater than 40 MPH), any raised feature that could serve as a blunt end or snag point must be a minimum of two feet six inches (2'-6") behind the front face toe of the barrier. Any railing placed on the top of the vehicle barrier must be continuous and meet crash testing criteria as outlined in Chapter 30 of the Bridge Manual.
- Any textures or patterns on the roadway face of a vertical face vehicle barrier are limited to a maximum depth of ½ inch and subject to the guidelines of NCHRP Report 554. Many of the typical aesthetic form liner patterns are not acceptable for use on the vehicle face of concrete barriers.

If you have any comments or questions regarding the interim policy please do not hesitate to Aaron Bonk, Development Engineer (608) 261-0261 or myself at (608) 266-0075.

Sincerely,

William Oliva, P.E.  
Chief, Structures Development Section  
WisDOT DTSD – Bureau of Structures

CC: Scot Becker, PE, Director, WisDOT, DTSD - Bureau of Structures  
Bridge Manual Distribution List

## January 2013 Bridge Manual Text Update Summary

<u>Chapter</u>	<u>Page Number(s)</u>	<u>Change</u>
2	3	Updated BOS organizational chart.
4	All	Revised entire chapter
5	5 - 20	Revised Contract Unit Bid Prices for 2012 and added new 2012 Tables
6	13	Added requirements for Tangent Offset locations to be shown on plans for structures on a curve.
	23	Clarified foundation data to be placed on the General Plan Sheet for pile foundations and spread footings.
	25	Removed old Plan Notes 10 & 11 that used to apply to New Construction
	25	Added "Policy Item" for what type of notes may and may not appear on bridge rehabilitation plans
	29	Added text to state that deflection and camber values are to be given to the nearest 0.1 inch for both girder and slab superstructures.
	32	Corrected list of non-bid and bid items for Box Culverts.
	40	Clarified how concrete quantity used in Full-Depth Deck Repair should be bid.
7	1-2, 6-13, 18	Updated section 7.1.4.2 regarding Geosynthetic Reinforced Soil - Integrated Bridge System technology.
11	6	Corrected reference to Section number for guidance on concrete seals
	51-53	Fixed references to table number. Revised and clarified WisDOT Policy Item
	58	Added reference number 19 for regarding revised pages 51-53
13	34	Changed the word "width" to "length"
14	47	Changed units for Total Differential Settlement in Table 14.4-3 to (in/in)

19	17	Changed text to show the two compressive stress checks for Service I and added the compressive stress check for Fatigue I
19EX1	27-31	Removed one of compressive stress limits for Service 1 Limit State because it is already used for the Fatigue 1 Limit State as shown in Example. Changed the coefficient for stress limit at top of deck under Service 1 from 0.45 to 0.40 to match the Bridge Manual text
19EX3	12, 20	Removed one of compressive stress limits for Service 1 Limit State because it is already used for the Fatigue 1 Limit State as shown in Example.
27	1, 11-17	Revised pot bearing section to high-load multi-rotational bearings and added guidance for use of disc bearings.

## January 2013 Standard Details Update Summary

### Chapter 4

- Std 4.01 ■ Revised notes for plywood backing on formliner

### Chapter 7

- NEW** Std 7.01 ■ GRS abutments general plan
- NEW** Std 7.02 ■ GRS abutments details

### Chapter 12

- Std 12.01 ■ Revised note to add reference to rodent shield details in FDM
  - Clarified the dimension from C/L brg to B.F. abut. when structural approach slab is present
- Std 12.03 ■ Revised note to add reference to rodent shield details in FDM
- Std 12.05 ■ Revised note to add reference to rodent shield details in FDM
- Std 12.08 ■ Revised note to add reference to rodent shield details in FDM
  - Clarified the dimension from C/L brg to B.F. abut. when structural approach slab is present
- Std 12.10 ■ Revised note to add reference to rodent shield details in FDM and showed notch for footing on plan view.
  - Revised filler at beginning of approach parapet to 1.5" to match expansion filler at end of approach
- Std 12.11 ■ Revised note to add reference to rodent shield details in FDM
  - Added designer note referring to the FDM Manual
  - Corrected symbol type to avoid duplication of already used symbol
  - Updated 'T02' and 'T03' notes to "top" of footing instead of "length" of footing

### Chapter 14

- Std 14.01 ■ Revised note to add reference to rodent shield details in FDM
- Std 14.03 ■ Revised note to add reference to rodent shield details in FDM
- Std 14.04 ■ Revised the bid item for which the eye bolt detail is to be paid under
  - Revised the bid item for which the size 2 coarse aggregate is to be paid under
  - Added a designer note stating that the slope paving is to be a part of the bridge plan (not retaining wall plan)
- Std 14.05 ■ Revised note regarding maximum skew angle in wrapped MSE wall abutment detail

### Chapter 17

- Std 17.01 ■ Added symbol and text to provide paving notch dimensions for structural approach slab
- Std 17.02 ■ Added "parapet/" in front of the word railing in two spots

### **Chapter 19**

- Std 19.31 ■ Added symbols and text to provide paving notch dimensions and dimension from C/L brg to B.F. abut. when structural approach slab is present
- Std 19.33 ■ Added symbol to provide paving notch dimensions for structural approach slab at semi-exp. abut.
- Std 19.36 ■ Moved holes in Detail B to match other side of detail
- Std 19.37 ■ Changed 1/2" dia. Washer to 5/16" in Part Transverse Section
- Std 19.51 ■ Changed wording in Notes from "Special Provisions" to "Standard Specifications"

### **Chapter 24**

- Std 24.12 ■ Revised Section Thru Expansion End detail clarification note

### **Chapter 27**

- Std 27.07 ■ Removed preliminary bearing size chart from standard

### **Chapter 28**

- Std 28.01 ■ Clarified when field splice is permitted in steel extrusions
  - Adjusted length of single slope barrier cover plate
- Std 28.02 ■ Placed table on standard showing location for placement of the cover plate
- Std 28.07 ■ Placed cover plate description for sloped face parapet on this standard

### **Chapter 30**

- Std 30.30 ■ Added 9 degree dimension to bar bend detail
- Std 30.31 ■ Added 9 degree dimension to bar bend detail
- Std 30.32 ■ Added 9 degree dimension to bar bend detail
- Std 30.33 ■ Added 9 degree dimension to bar bend detail

### **Chapter 36**

- NEW** Std 36.07 ■ Pipe opening in culvert wall

### **Chapter 39**

- Std 39.02 ■ Added word "standard" to clarify type of hole required
- Std 39.09 ■ Added word "standard" to clarify type of hole required
- Std 39.10 ■ Added word "standard" to clarify type of hole required