



# WisDOT Bridge Manual

## January 2024 Updates

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Policy and Standards Engineer  
February 21, 2024

# Agenda

- Resources
- Updates (Chapter, Standard, and Inserts)
- Miscellaneous
- In The Works
- Questions and Feedback



# Housekeeping

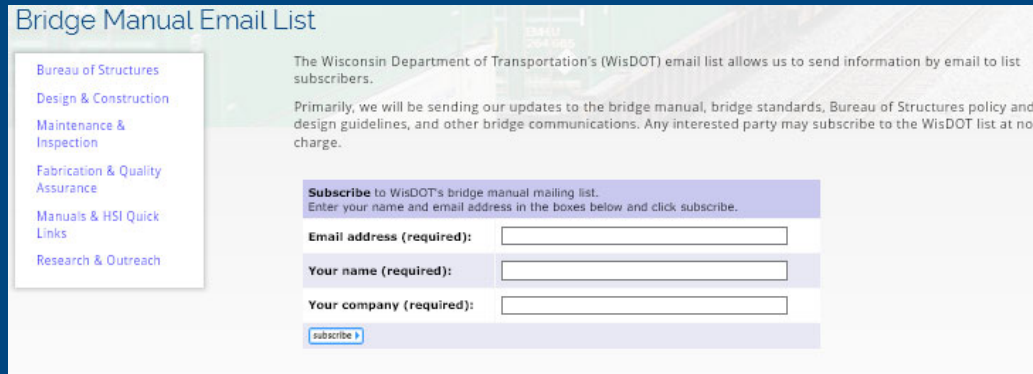
- All participants are muted
- A handout of this webinar is posted on our website (See Update Archives)
- If you have a question, please use the chat feature to submit your question or raise your hand. Questions will be addressed at the end of the webinar.
- Follow-up questions, please send to [James.luebke@dot.wi.gov](mailto:James.luebke@dot.wi.gov)



# Resources

<https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/bm-mail-list.aspx>

- Added to email distribution list:



The screenshot shows a web page titled "Bridge Manual Email List". On the left is a navigation menu with links: "Bureau of Structures", "Design & Construction", "Maintenance & Inspection", "Fabrication & Quality Assurance", "Manuals & HSI Quick Links", and "Research & Outreach". The main content area explains that the Wisconsin Department of Transportation's (WisDOT) email list allows sending information by email to subscribers. It states that updates will be sent regarding the bridge manual, standards, policy, and design guidelines. Below this is a subscription form with the following fields: "Email address (required)", "Your name (required)", and "Your company (required)". A "Subscribe" button is located at the bottom of the form.

- Removed from email distribution list:
  - Send an email to [James.Luebke@dot.wi.gov](mailto:James.Luebke@dot.wi.gov)



# Resources

<https://wisconsin.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/bridge-manual.aspx>

Or web search “WisDOT Bridge Manual”

### Design Policy Memos

- Bureau of Structures
- Design & Construction**
- Maintenance & Inspection
- Fabrication & Quality Assurance
- Manuals & HSI Quick Links
- Research & Outreach

#### Design & Construction

[Policy Memos](#) | [Bridge Manual](#) | [Special Provisions](#) | [Standard Bridge Design Tool](#) | [Survey Reports & Checklists](#) | [Structure Costs](#) | [Plan Submittal](#) | [Bridge Technical Committee](#) | [Construction Resources](#) | [Contacts](#)

Description	Date
<a href="#">Standard Bridge Design Tool</a>	09/17/21
<a href="#">BOS Contact on Structure Plans</a>	02/11/20
<a href="#">Updates to QA/QC Plan Requirements</a>	06/20/19
<a href="#">MASH Parapet Clarification</a>	09/14/17
<a href="#">On Time Submittal and SSR Training</a>	03/02/16

### Bridge Manual Chapters

- Bureau of Structures
- Design & Construction**
- Maintenance & Inspection
- Fabrication & Quality Assurance
- Manuals & HSI Quick Links
- Research & Outreach

#### Bridge Manual

[Chapters](#) | [Standard Drawings](#) | [Insert Sheets \(C3D\)](#) | [Insert Sheets \(MicroStation\)](#) | [C3D Resources](#) | [MicroStation Resources](#) | [Updates Archive](#)

Updates to the Bridge Manual chapters occur about every six months. [Sign up to receive updates to the Bridge Manual.](#)

Description	Updated
<a href="#">Chapter 1 - Index</a>	07/20
<a href="#">Chapter 2 - General</a>	01/23



# Resources

- Update Archives
  - Update Memo
  - Bridge Manual Text Update Summary
  - Standard Details Update Summary
  - Standards Tracker \*
  - Update Presentation Slides

\* Not used for 01/24 update



DATE: January 26, 2023  
 TO: Bridge Manual Users  
 FROM: DTSD - Bureau of Structures  
 SUBJECT: January 2023 Bridge Manual Update

### January 2023 Bridge Manual Text Update Summary

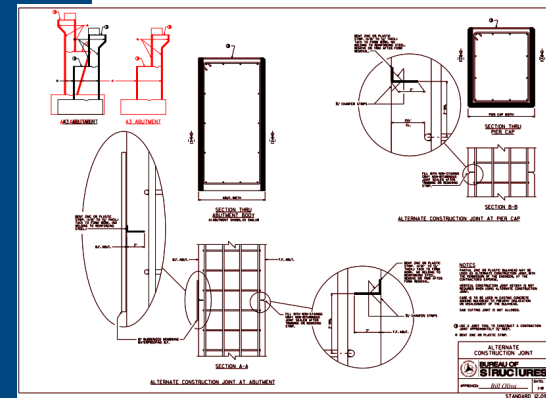
Chapter	Page Number(s)	Change
2	3	Updated Bureau of Structures organization chart
	15	Added text "only one structure number for the site."
6	45	Changed "Subsurface" to "Site"
	47	Changed "Subsurface" to "Site"
	47	Added bullet point 3: "Final Site Investigation Report"
	48	Added Section 6.5.7 - Locally-Funded Projects
	49	Changed "Subsurface Exploration" to "Site Investigation"

### January 2023 Standard Details Update Summary

19	44	Cla req
19E-4	2	Adt. forh con req
	2	Ch

- Chapter 4**
- Std 4.01 ■ No revisions.
  - Std 4.02 ■ No revisions.
  - Std 4.03 ■ No revisions.
  - Std 4.04 ■ No revisions.
  - Std 4.05 ■ No revisions.

- Chapter 7**
- Std 7.01 ■ No revisions.



# Civil 3D Updates

- Standards Converted (MicroStation → C3D → PDF)
  - No content changes
  - No track changes (due to conversion)
  - Archived 07/23 Standards (MicroStation)
- Overhead Sign Structure
  - Removed archived MicroStation files
- Insert Sheets
  - Expect to remove 01/22 archived MicroStation files *(07/24 tentative)*

Bridge Manual

[Chapters](#) | [Standard Drawings](#) | [Insert Sheets \(C3D\)](#) | [Insert Sheets \(MicroStation\)](#) | [C3D Resources](#) | [MicroStation Resources](#) | [Updates Archive](#)

This is an archive of the updates to each release of the LRFD Bridge Manual. Updates consist of memos, insert sheets, standard detail drawings and Bridge Manual text.

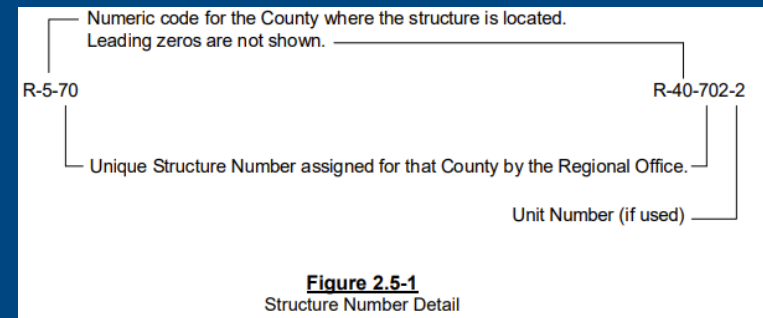
Description	Updated
January Memo	01/24
January Inserts Zip File	01/24
January Standards	01/24
January Text	01/24
January Webinar Slides	01/24
July Memo	07/23
July Inserts Zip File	08/23
July Standards	07/23
July Text	07/23
July Webinar Slides	07/23
Standards Archive	07/23



# Chapter Update

- Chapter 2

- The practice of assigning "unit" numbers to B-Structures has been discontinued.
- Existing bridge structures assigned unit numbers will remain in place, unless directed otherwise.
- Changed example to Retaining Wall (R)





# Chapter Update

- Chapter 8 – Scour
  - Numerous updates throughout for added guidance on scour calculations and documentation.

8	4	Added "or 1% chance" for design discharge
	5	Replaced "This criteria" with "This criterion"
	6	Minor changes
	7	Section 8.2.1 has an updated reference for new regression equations published by USGS in 2023.
	7-8	Updated Section 8.2.3 from "Watershed Comparison" to "Project Site at Ungaged Location on a Gaged Stream"
	9	Added "Velocities with potential to compromise slope or streambed stability are not acceptable and should be avoided. This threshold will vary depending on site geometry and local stream geomorphology."
	11	Added guidance on "incipient overtopping"
	17	Added paragraph on scour calculation sources and noted that scour calculations performed using the HEC RAS built-in calculators are not allowed.
	18	Updated the location of the approach section for scour evaluations
	18	Added paragraph break in first paragraph and added sentence clarifying pressure flow scour depth and vertical contraction scour.
	22	Minor - Added paragraph break
	23	Clarified scour countermeasure design considerations
	50	Updated references #2 and #3
	53	Added guidance on scour calculations for the Hydraulic/Site Report. The department has been seeking to improve report submittals for scour documentation.

## 8.2.2 Project Site at Streamgage

An attachment to reference (2) above includes flood frequency discharges for 299 gaged sites computed using flood records through water year 2020. These flood frequency discharge estimates were generated using the Log-Pearson Type III (LP3) distribution method as described in Bulletin 17C entitled *Guidelines For Determining Flood Flow Frequency*<sup>3</sup> and the guidelines for weighting the station skew with the generalized skew in *NR116.07, Wisconsin's Floodplain Management Program*<sup>1</sup>. Additional years of data are available from the USGS for some gaged watersheds. Flood frequency discharge estimates for these watersheds can be updated beyond water year 2020 using the same methodology as described above.

In addition to the LP3 method, reference (2) describes a theoretically improved estimate of flood discharge that combines the LP3 discharge estimate with the regression estimate for the gaged site. More details on this method can be found under the section titled "Estimating the Weighted Flood Discharge at a Streamgage."

## 8.2.3 Project Site at Ungaged Location on a Gaged Stream

If a project site is located on a stream with an existing streamgage (but is not at the gage itself), results obtained from the above regression equations can be combined with the flood discharge estimate at the gage to produce an improved peak flow estimate. More details are

January 2024

8-7

# Chapter Update

- Chapter 11 – Preboring Piles
  - Consolidated guidance (11.3.1.1, 11.3.1.6, 11.3.1.17.6, 12.3.1)
  - Added - guidance for displacement piles encountering a strong upper stratum with weak underlying soils.
  - Revised guidance for scour considerations.
  - Added - “For problem soils, contact the Bureau of Technical Services, Geotechnical Engineering Unit to discuss preboring considerations.”



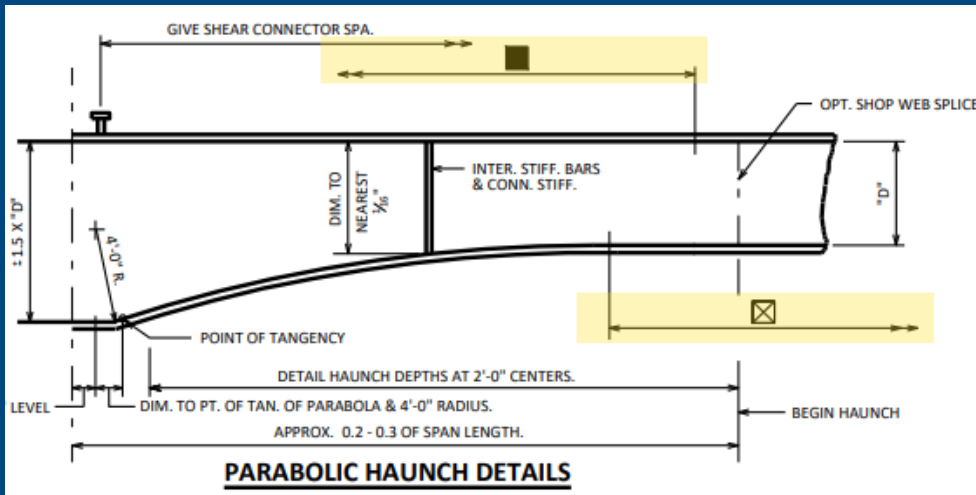
# Chapter Update

- Chapter 24 – Tension Zones
  - Added guidance for showing tension zones on contract plans.
  - Calculate and show the tension zones on top and bottom flanges for all continuous steel girders.
  - The defined tension zone will assist with inspection and prohibit field welding within the tension zone, unless noted otherwise (i.e. shear connectors).
  - Updated Standard 24.02



# Chapter Update

## • Chapter 24 – Tension Zones (Std 24.02)



### NOTES

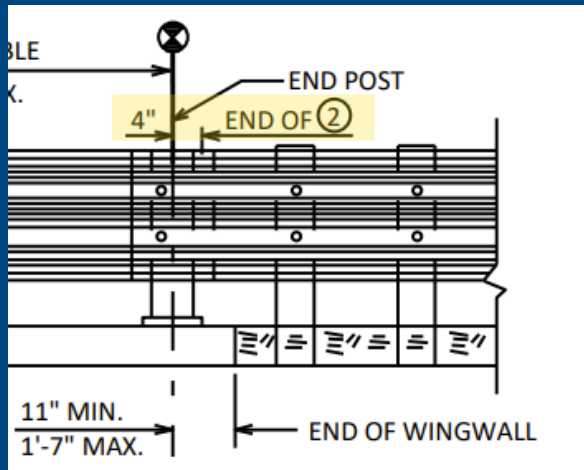
- TOP FLANGE TENSION ZONE. FIELD WELDING PROHIBITED IN TOP FLANGE TENSION ZONE AREAS, EXCEPT SHEAR CONNECTORS.
- ☒ BOTTOM FLANGE TENSION ZONE. FIELD WELDING PROHIBITED IN BOTTOM FLANGE TENSION ZONE AREAS.

### DESIGNER NOTES

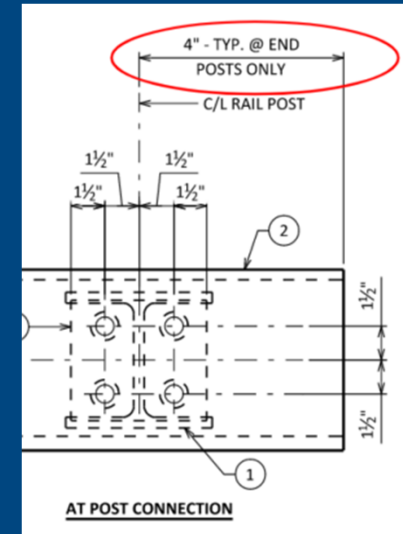
SHOW THE TENSION ZONES ON THE PLANS.

# Standard Update

- Std. 30.02
  - Added dimension note for C8x11.5 member



② C8x11.5 WITH  $1\frac{3}{16}$ " DIA. HOLES FOR NO. 8.



Insert Sheet: railw.dwg

# Standard Update

- Std. 36.01
  - Provide load ratings for new concrete box culverts (req'd for B-Structures)
  - Added Designer Note

**DESIGN DATA**  
LIVE LOAD:  
DESIGN LOADING: HL-93  
INVENTORY RATING FACTOR: RF=1.05  
OPERATING RATING FACTOR: RF=1.35  
WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV): 255 (KIPS)

Std. 36.01 (07/23)

**DESIGN DATA**  
LIVE LOAD:  
DESIGN LOADING: HL-93  
INVENTORY RATING FACTOR: RF=1. \_\_  
OPERATING RATING FACTOR: RF=1. \_\_  
WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV): \_\_ (KIPS)

Std. 36.01 (01/24)

**DESIGN DATA**  
LIVE LOAD:  
DESIGN LOADING: HL-93  
INVENTORY RATING: RF = 1.01  
OPERATING RATING: RF = 1.31  
WISCONSIN STANDARD PERMIT VEHICLE (WIS-SPV): 250 (KIPS)

Contract Plans (Example)

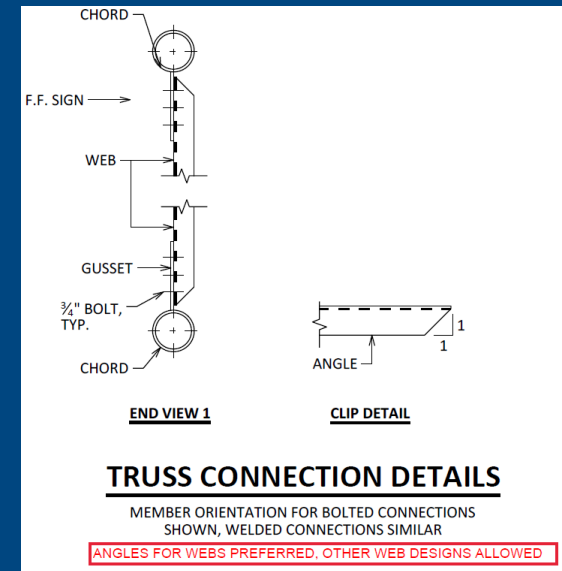
## **DESIGNER NOTES**

SEE CHAPTER 45 FOR LOAD RATING OF EXISTING CONCRETE BOX CULVERTS



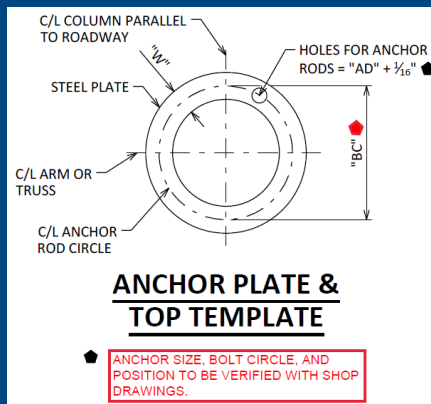
# Standard Update

- 39.02 - MONOTUBE & 2-CHORD TRUSS CONNECTIONS 2
  - Added “Angles preferred, other web designs allowed”



# Standard Update

- 39.04 - MONOTUBE & 2-CHORD TRUSS FOUNDATIONS
  - Updated anchor note
  - Added anchor note symbol to "BC" dimension
  - Removed quantity from table

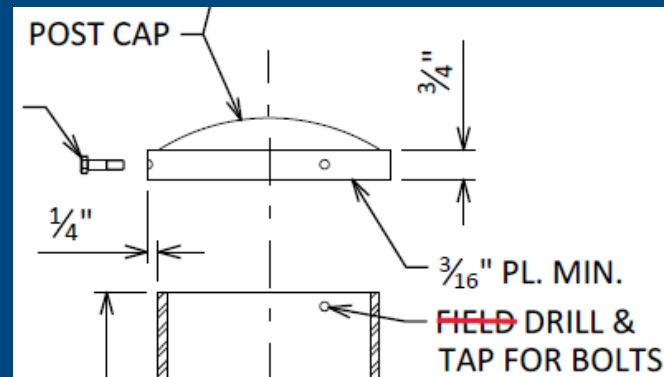
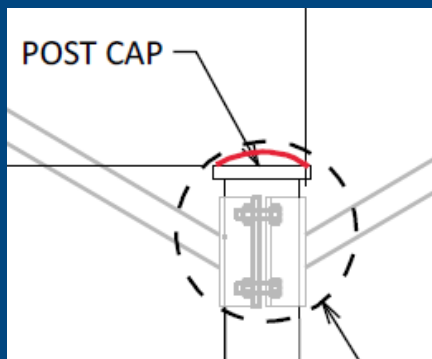


ESTIMATED QUANTITIES - FOUNDATION							
STANDARD DESIGN TYPE	CONCRETE MASONRY (CY)	STEEL REINFORCEMENT HS (LBS)	FOUNDATION DRILLING (DIA.) (LF)				
			24"	30"	36"	42"	48"
MFI	2	240	12	---	---	---	---
MFI	3	410	<del>12</del>	13	---	---	---



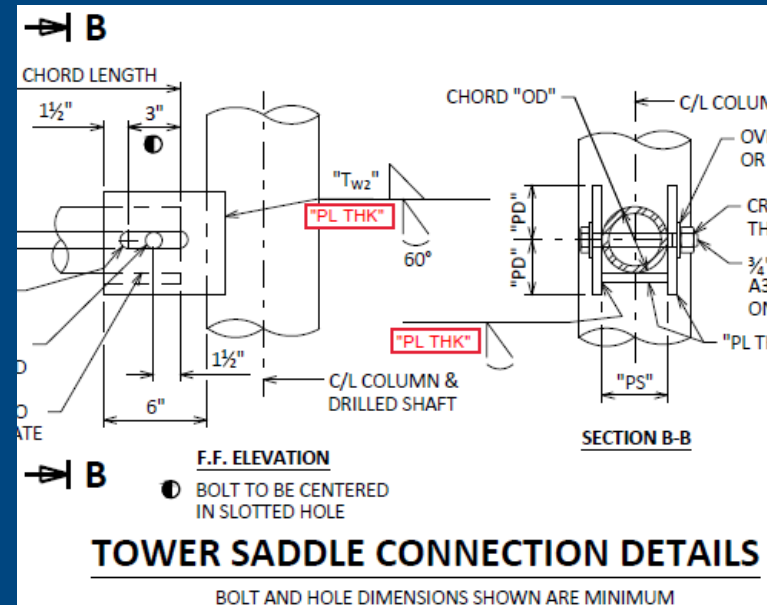
# Standard Update

- 39.12 - 2-CHORD BUTTERFLY POLE DETAILS
  - Added post cap
  - Updated "Clamp Details" note



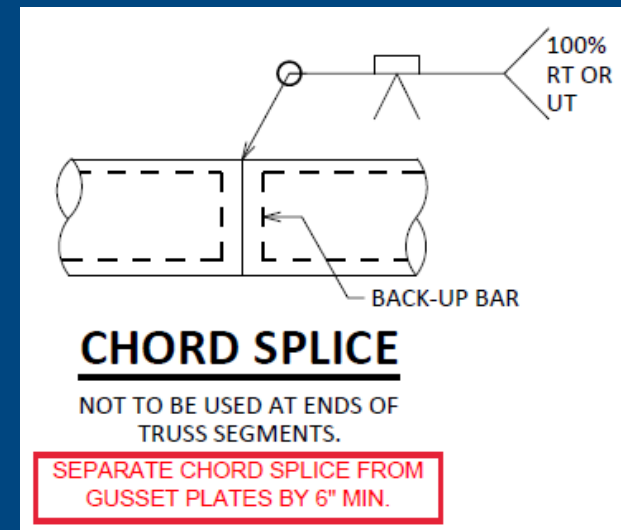
# Standard Update

- 39.32 - 4-CHORD TRUSS FULL SPAN COLUMN DETAILS
  - Added "PL THK" to two welds



# Standard Update

- 39.34 - 4-CHORD TRUSS FULL SPAN CONNECTIONS 2
  - Added “Separate chord splice from gusset plates by 6” min.”



# Standard Update

- 27.02 - FIXED BEARING DETAILS TYPE 'A' - STEEL GIRDERS
  - Corrected table value from 2 15/15" → 1 15/16" (Updated 2/24)

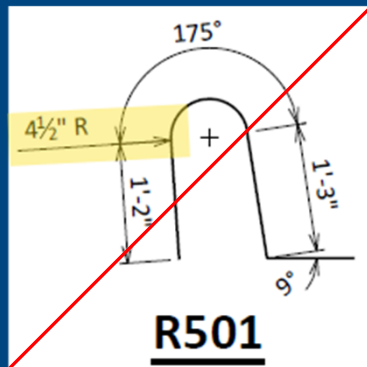
LENGTH OF PLATE "C"	TOTAL LOAD KIPS	PLATE C			PLATE D			HEIGHT FEET
		X	Y	Z	X	Y	Z	
10"	215	5"	2 3/8"	10"	8"	1 3/4"	1'-7"	0.354
12"	260	5"	2 3/8"	1'-0"	9"	1 3/4"	1'-9"	0.354
	280	5"	2 3/8"	1'-0"	10"	2 3/8"	1'-9"	0.406
14"	280	5"	1 15/16"	1'-2"	9"	1 3/4"	1'-11"	0.318
	335	5"	2 3/8"	1'-2"	11"	2 3/8"	1'-11"	0.406
	385	5"	2 3/8"	1'-2"	1'-1"	2 7/8"	1'-11"	0.448
	410	5"	2 3/8"	1'-2"	1'-3"	2 7/8"	2'-0"	0.448
16"	275	5"	1 15/16"	1'-4"	8"	1 3/4"	2'-1"	0.318
	330	5"	2 15/16"	1'-4"	10"	2 3/8"	2'-1"	0.370
	390	5"	2 3/8"	1'-4"	1'-0"	2 3/8"	2'-1"	0.406
	465	5"	2 3/8"	1'-4"	1'-2"	2 7/8"	2'-2"	0.448
	490	5"	2 3/8"	1'-4"	1'-4"	3 3/8"	2'-2"	0.490

1 15/16"

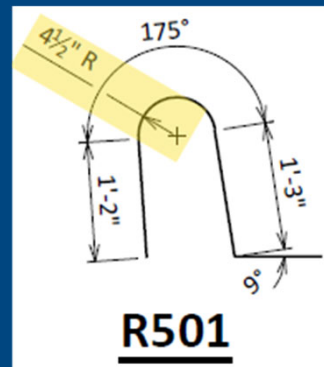


# Insert Update

- SS32, SS36, and SS42 (Updated 2/24)
  - Corrected bar bends to reference inside radius



Old Insert



Updated Insert

# Miscellaneous

- Reminder: Civil 3D insert sheets are the most current. MicroStation insert sheets have not been updated since the January 2022.



# In The Works

- Updated Year End Structure Cost Summary (In-progress)

2019 Year End Structure Cost Summary																						
Prestressed I-Girder - Grade Separations													On System					Off System				
Letting Date	Structure Number	Abut. Type	Pier Type	No Span	Span Length	Area SqFt	Total Cost	Total SqFt Cost	Super Cost	Super SqFt Cost	Area SqFt	Total Cost	Total SqFt Cost	Super Cost	Super SqFt Cost							
1/15/2019	B610215	A1			1'44	9214	\$1,027,943.46	\$111.56	\$555,800.50	\$60.59												
1/15/2019	B610216	A1			1'44	9214	\$1,442,096.33	\$156.62	\$587,039.59	\$63.71												
3/12/2019	B530348	A1			1'10	7083	\$1,365,808.52	\$192.84	\$432,247.90	\$61.03												
3/12/2019	B530349	A1			1'10	7083	\$1,016,597.30	\$143.53	\$430,372.90	\$60.76												
3/12/2019	B530351	A1			1'09	4562	\$592,495.39	\$129.88	\$254,552.63	\$55.80												
3/12/2019	B530352	A1			1'09	4500	\$576,375.13	\$128.08	\$253,360.13	\$56.30												
3/12/2019	B530353	A1			1'115	7398	\$1,412,730.78	\$190.96	\$451,171.07	\$60.99												
3/12/2019	B530354	A1			1'115	7398	\$1,005,841.56	\$146.78	\$449,183.57	\$60.72												
3/12/2019	B530355	A1			1'59	6060	\$1,383,289.28	\$228.27	\$400,166.68	\$67.35												
3/12/2019	B530356	A1			1'59	6060	\$1,065,287.45	\$175.79	\$406,561.68	\$67.09												
7/9/2019	B130728	A1	Multi-Column	2	110, 116	14432	\$2,663,634.47	\$184.56	\$1,037,285.85	\$71.87												
7/9/2019	B530302	A1	Multi-Column	2	134, 134	13528	\$2,218,924.47	\$164.02	\$1,467,489.60	\$108.48												
7/9/2019	B530303	A1	Multi-Column	2	134, 134	17062	\$2,627,617.34	\$154.00	\$1,797,635.60	\$105.36												
7/9/2019	B530307	A1			1'85						3174	\$1,196,592.08	\$377.00	\$262,037.60	\$82.56							
9/10/2019	B401002	A1	Multi-Column	2	100, 100						11895	\$1,313,890.00	\$110.46	\$722,983.60	\$60.78							
12/10/2019	B130729	A1			1'43						9386	\$1,427,300.18	\$153.70	\$768,530.35	\$82.76							
12/10/2019	B130750	A1			1'44						9448	\$1,564,392.14	\$165.58	\$797,457.50	\$84.40							
12/10/2019	B130731	A1	Multi-Column	2	129, 92						14240	\$2,459,726.33	\$172.73	\$1,077,540.15	\$75.67							
12/10/2019	B130732	A1	Multi-Column	3	42, 60, 42						9349	\$1,528,890.20	\$163.54	\$634,918.70	\$67.91							
							<b>Total Area Total Structures Cost</b>		<b>Total Super Cost</b>		<b>Total Area</b>	<b>Total Structures Cost</b>		<b>Total Super Cost</b>								
							115594	\$18,479,741.48		\$8,560,946.61	57392	\$9,490,790.91		\$4,263,467.90								
<b>TOTALS</b>													<b>No. Bridges</b>	<b>Total Sq. Ft. Cost</b>	<b>Super Sq. Ft. Cost</b>							
ON SYSTEM													13	\$162.68	\$75.36							
OFF SYSTEM													6	\$165.37	\$74.29							
TOTAL SYSTEM													19	\$163.58	\$75.00							



# Questions and Feedback

Contact:

James Luebke, P.E.

Policy and Standards Engineer

608-266-5098

[James.Luebke@dot.wi.gov](mailto:James.Luebke@dot.wi.gov)

