



WisDOT Structural Engineers Symposium

Program Agenda

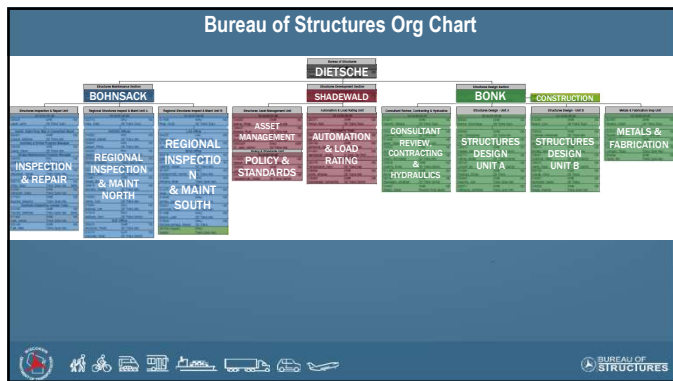
May 26, 2026

8:00 a.m.	Registration	11:50 p.m.	Lunch/Networking
8:30 a.m.	Administrator's Office Remarks – <i>DTSD Deputy Secretary Michael Hoelker</i>	12:50 p.m.	Wisconsin Highway Research Program – <i>James Luebke</i>
8:40 a.m.	BOS Director's Perspective – <i>Josh Dietsche</i>	1:05 p.m.	Two-Tier Retaining Wall System Geo-Structural Design Using FEA – <i>Ed McCright, Ali Albatal (Jacobs)</i>
8:50 a.m.	WisDOT Local Program Updates – <i>Laura Shadewald</i>	1:40 p.m.	Geotechnical Updates – <i>Dave Staab</i>
9:15 a.m.	Standard Specifications Reorganization – <i>MK Kang (BTS)</i>	2:05 p.m.	Scour/Pile Analysis Recommendations and Update – <i>James Luebke, Andrew Smith, Steve Neary</i>
9:30 a.m.	BOS Initiatives/Policy & Standards Updates – <i>James Luebke</i>	2:25 p.m.	Consultant Review Updates – <i>Max Kulick</i>
9:45 p.m.	Inspections/Findings, Structural Reviews, and Load Ratings – <i>Alex Pence</i>	2:35 p.m.	Break/Networking (Beverages and Snacks)
10:10 a.m.	Break/Networking (Beverages and Snacks)	2:55 p.m.	Main Street Bascule Bridge Rehabilitation – <i>Dan Machamer (Hardesty & Hanover)</i>
10:35 a.m.	Truss Type Selection and Redundancy for the Black Hawk Bridge – <i>Greg Hasbrouck (Parsons)</i>	3:30 p.m.	WisDOT Design-Build Updates – <i>Laura Shadewald</i>
11:10 a.m.	Small Group/Table Discussion – <i>All</i>	3:45 p.m.	Interactive Survey and Final Q&A
11:30 a.m.	BOS Staff Panel Discussion – <i>Josh Dietsche, Laura Shadewald, Dominique Bechle, Max Kulick</i>	4:00 p.m.	Adjourn

Conference Location: Madison College
1701 Wright Street - Madison, WI 53704

For today's presentations, agenda, and proof of attendance, please visit:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/research.aspx>

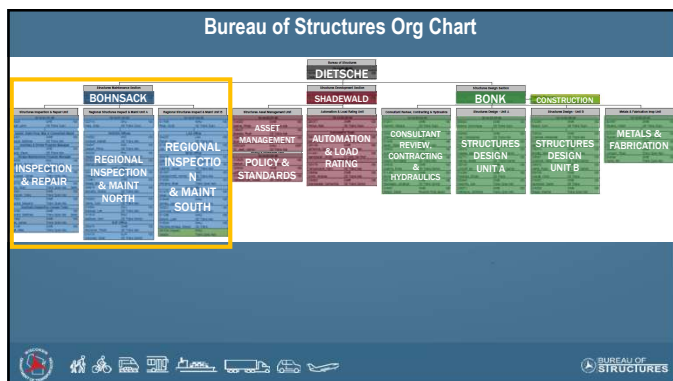


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Josh Dietsche, PE
Director
All Units
All Sections

- WisDOT / BOS since 2010
- Education:
 - Wausau East - 1995
 - UW-Madison: B.S. - 2000, M.S. - 2002
- Main Job Responsibilities:
 - Bureau oversight/leadership
- Interests / Expertise:
 - Attending meetings
- Personal / Fun Facts:
 - Married (Chris) with two kids; Greta (18), Gabe (16)...and Bear (2) & Mollie (3)
 - Avid runner, Badger fan, love the outdoors

2



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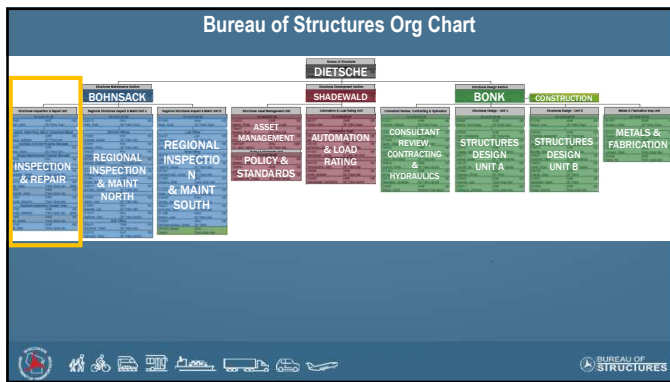


- WisDOT / BOS since 2021 (1994)
- Education:
 - Lena-Winslow HS (1989)
 - BSCE – UW Platteville (1993)
- Main Job Responsibilities:
 - Management of structure inspection, maintenance, operation and related programs
- Interests / Expertise:
 - Bridge inspection, maintenance, and operation.
- Personal / Fun Facts:
 - Sense of humor
 - Enjoy outdoor activities

Dave Bohnsack, PE
Maintenance Chief
Maintenance Section



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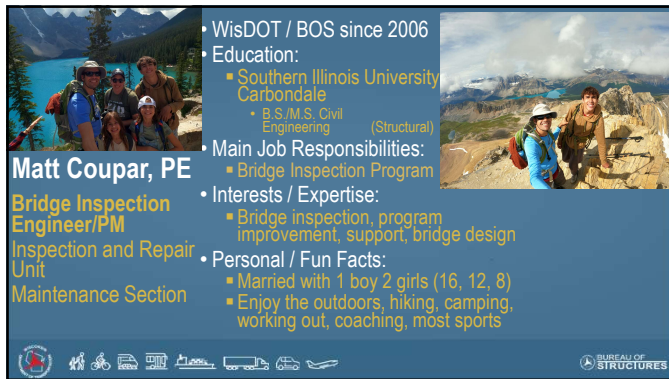


- WisDOT (2001) / BOS (2021)
- Education:
 - BSCE UW Platteville - 1993
- Main Job Responsibilities:
 - Manage Structure Maintenance, Structure Repairs, Drone Program, Lift Bridge Program, BOS Fleet and Budget
- Interests / Expertise:
 - All my main job responsibilities
- Personal / Fun Facts:
 - Son plays football for the Badgers.
 - I played soccer for UWP
 - I love to lift weights everyday (if possible)
 - I am really interested in technology
 - I am a volunteer firefighter.
 - Wife (Sara married 27 years), Sons (Gavin, 20 and Cody, 13) and daughters (Maya, 18 and Kala, 14)

Jason Lahm, PE
Supervisor
Inspection and Repair Unit
Maintenance Section



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Matt Coupar, PE
 Bridge Inspection Engineer/PM
 Inspection and Repair Unit
 Maintenance Section

- WisDOT / BOS since 2006
- Education:
 - Southern Illinois University Carbondale
 - B.S./M.S. Civil Engineering (Structural)
- Main Job Responsibilities:
 - Bridge Inspection Program
- Interests / Expertise:
 - Bridge inspection, program improvement, support, bridge design
- Personal / Fun Facts:
 - Married with 1 boy 2 girls (16, 12, 8)
 - Enjoy the outdoors, hiking, camping, working out, coaching, most sports

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Steven Doocy, PE
 State Ancillary PM
 Inspection and Repair Unit
 Maintenance Section

- WisDOT (2011) / BOS (2013)
- Education:
 - Milwaukee School of Engineering
 - B.S./M.S. in Structural Engineering
- Main Job Responsibilities:
 - State-wide ancillary structures inspection
 - Drone Inspections
- Interests / Expertise:
 - Drones
 - Bolting
 - Sign Structures
- Personal / Fun Facts:
 - Married with 2 kids

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Anthony Stakston, PE
 Maintenance Engineer
 Inspection and Repair Unit
 Maintenance Section

- WisDOT / BOS since 2021 (2021)
- Education:
 - UW-Madison: B.S. - 2000, M.S. - 2002
- Main Job Responsibilities:
 - State-wide maintenance for structures.
- Interests / Expertise:
 - Structure Maintenance
- Personal / Fun Facts:
 - Minnesota Viking Fan
 - Enjoy hiking, fishing, and outdoors.

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Macaine Bouche
Trans. Specialist Adv.
 Inspection and Repair
 Unit
 Maintenance Section

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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Vacant
Trans. Specialist Adv.
 Inspection and Repair Unit
 Maintenance Section

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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Vacant
Trans. Specialist Adv.
 Inspection and Repair Unit
 Maintenance Section

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
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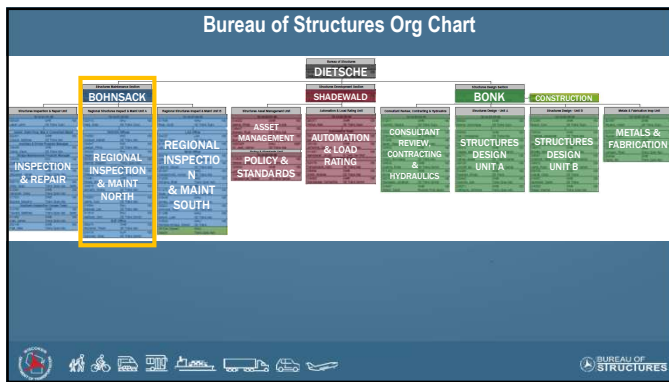
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Mark Dent
 Trans. Specialist Adv.
 Inspection and Repair
 Unit
 Maintenance Section

- WisDOT / BOS since 2009
- Education/Prior Work:
 - Lincoln High School
 - UW Parkside Bridge Inspection Class
- Main Job Responsibilities:
 - Structure Inspection and Repair
- Interests / Expertise:
 - Reach All Operation

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Greg Haig, PE
 Inspection/Maintenance
 Supervisor
 North Unit

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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Mariah Krueger, PE
Inspection PM
 North Inspection Unit - WIS
 Maintenance Section

- WisDOT / BOS since 2022 (2015)
- Education:
 - UW-Platteville Civil Engineering (2014)
- Main Job Responsibilities:
 - Oversee region bridge inspection program
 - Perform structure inspections
 - Aid in scoping & project reviews
- Interests / Expertise:
 - Structure inspection
 - Roadway design (prior to BOS)
- Personal / Fun Facts:
 - Enjoy travelling and outdoor activities such as hiking, camping, and hunting
 - Goal to visit all national parks (I have a long way to go)

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane BUREAU OF STRUCTURES

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Philip Saeger, PE
Ancillary Structure PM
 North Inspection Unit - WIS
 Maintenance Section

- WisDOT / BOS since 2022 (2013)
- Education:
 - UW-Platteville (2013)
- Main Job Responsibilities:
 - Bridge & Ancillary Inspection/Maintenance
- Interests / Expertise:
 - Structural Maintenance / Inspections (NCR)
- Personal / Fun Facts:
 - Hunting & Fishing
 - Married with 2 boys

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane BUREAU OF STRUCTURES

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Emerson Hegeman
Maintenance Engineer
 North Inspection Unit - RHI
 Maintenance Section

- WisDOT / BOS since 2022
- Education:
 - UW-Platteville (2019) BS-Civil Engineering
- Main Job Responsibilities:
 - Structure Maintenance and Inspection
- Interests / Expertise:
 - Bridge Maintenance and Inspection
- Personal / Fun Facts:
 - Welder, Class A CDL, Diver, Outdoorsman
 - I have spent time in 36 states and 5 countries

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane BUREAU OF STRUCTURES

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Eugene Werner
Trans. Specialist Adv.
 North Inspection Unit – WIS
 Maintenance Section

- WisDOT / BOS since 2022 (1989, [redacted])
- Education:
 - Mid-State Technical College
- Main Job Responsibilities:
 - Bridge & Ancillary Inspection/Maintenance
- Interests / Expertise:
 - Watersheds / Structure Maintenance & Inspection
- Personal / Fun Facts:
 - Married (+30 Years) two Boys (mid 20s)
 - Enjoy the outdoors, camping, golf, fishing, hunting, downhill skiing, football fan



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Marc Roesler, PE
Maintenance Engineer
 North Inspection Unit – GRE
 Maintenance Section

- WisDOT / BOS since 2023 (2 [redacted])
- Education:
 - UW-Platteville – Civil Engineering (2010)
- Main Job Responsibilities:
 - Bridge Maintenance and Inspection
- Interests / Expertise:
 - Bridge Maintenance and Inspection
 - Project Construction
- Personal / Fun Facts:
 - Wife (Kristin – Married 14 years), 3 Children (Brielle 12, Connor 10, Eliana 8)
 - Enjoy coaching and watching the kids sporting events. Hunting, family vacations and being outdoors.




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Brady Rades, PE
Inspection PM
 North Inspection Unit - GRE
 Maintenance Section

- WisDOT / BOS since 2022 (2012)
- Education:
 - UW-Madison - Civil Engineering (2008)
- Main Job Responsibilities:
 - Oversee region bridge inspection program
 - Perform structure inspections & assist with maintenance and scoping/project reviews
- Interests / Expertise:
 - Structure inspection & maintenance
- Personal / Fun Facts:
 - Wife (Christina married 13 years) & 4 Children, Preston (9), Landon (7), Dawson (3.5), Zoe (8 months)
 - Enjoy kids' sporting activities, building projects around the house and anything music



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Sam Mattison
Maintenance Engineer
 North Inspection Unit - EAU
 Maintenance Section

- WisDOT / BOS since 2023 (2023)
- Education:
 - University Wisconsin Oshkosh (BS – Environmental Engineering)
- Main Job Responsibilities:
 - Structure inspection and Maintenance
- Interests / Expertise:
 - Bridge maintenance/inspection
- Personal / Fun Facts:
 - Enjoy traveling, camping, hiking, fishing, & being outdoors

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane BUREAU OF STRUCTURES

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Travis McDaniel, PE
Inspection PM
 North Inspection Unit - SUP
 Maintenance Section

- WisDOT / BOS since 2001
- Education:
 - University of Missouri - Columbia
 - B.S. / M.S. in Civil Engineering
- Main Job Responsibilities:
 - Oversight of structures inspection, improvements, maintenance and repair for NW-Superior.
- Interests / Expertise:
 - Inspection Policy and Procedures
 - Maintenance and Repair
- Personal / Fun Facts:
 - Married. No Kids. Two Cats.
 - Unabashed Missouri Tiger and KC Chiefs fan
 - Enjoy traveling, cooking, and playing sports.

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane BUREAU OF STRUCTURES

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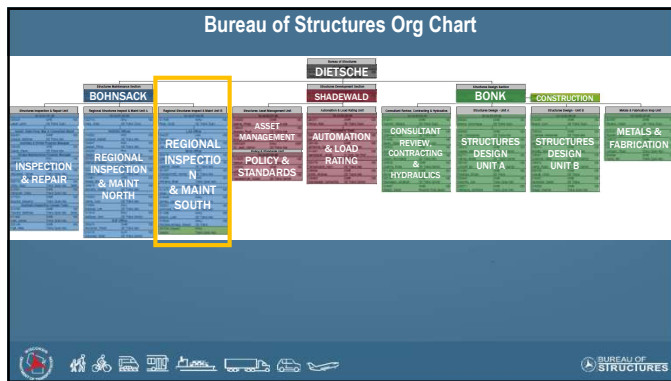


Vidar Sanchez, E.I.T.
Maintenance Engineer
 North Inspection Unit - SUP
 Maintenance Section

- WisDOT / BOS since 2023 (2018)
- Education:
 - University of Minnesota Duluth
 - B.S. in Civil Engineering
- Main Job Responsibilities:
 - Perform structure inspections & assist with maintenance
- Interests / Expertise:
 - Bridge Inspections and Maintenance
- Personal / Fun Facts:
 - Transplant to the Midwest
 - Learning to embrace the cold

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane BUREAU OF STRUCTURES

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Scott Reay, PE
Supervisor
South Inspection Unit - WAU
Maintenance Section


- WisDOT / BOS since 2022 (2015)
 - NE Region SET in construction 1995/1996
- Education:
 - Michigan Tech - BS/MS - Civil/Structural (1998)
- Main Job Responsibilities:
 - SE Region Bridge and Tunnel Inspection Program Manager
 - Snooper Operator, UAS Pilot
- Interests / Expertise:
 - Inspection technology, data and efficiency
 - Precast/Prestressed Concrete (prior to DOT)
- Personal / Fun Facts:
 - Married with 2 teenage boys, enjoy boating, skiing, building things around the house and sets for school plays

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Craig Fisher, PE
Inspection PM
South Inspection Unit - LAX
Maintenance Section

- WisDOT / BOS since 2022 (1998)
- Education:
 - UW-Madison (1989) BS-Civil Engineering
- Main Job Responsibilities:
 - Oversight of structures inspection, improvements, maintenance and repair for SW-La Crosse.
- Interests / Expertise:
 - Inspection methods, quality control
 - Construction, Inspection, & Maintenance
- Personal / Fun Facts:
 - National Park geek
 - Love fishing
 - Studying to become a private pilot

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Jered Lex, PE
Maintenance PM
 South Inspection Unit - LAX
 Maintenance Section

- WisDOT / BOS since 2025 (2017)
- Education:
 - UW-Platteville, BS Civil Engineering (2015)
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Spent last 9 years in PDS
 - Structure inspection/ maintenance
- Personal / Fun Facts:
 - Married with two kids (6 and 4)
 - Enjoy fishing and hunting

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Pete
Inspection PM
 South Inspection Unit - MAD
 Maintenance Section

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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Steve Katzner, PE
Inspection PM
 South Inspection Unit - MAD
 Maintenance Section

- WisDOT / BOS since 2001/2020
- Education:
 - AAS Civil Engineering Technology – Michigan Tech University 1995
 - BSCE Civil Engineering – UW Platteville 2000
- Main Job Responsibilities:
 - Bridge Maintenance Manager
- Interests / Expertise:
 - Field work – on the fly/Jack of all trades
 - Being outdoors for work and play
- Personal / Fun Facts:
 - Only child... but I still didn't do it!
 - Hunter/Biker/Baseball coach
 - I like lifting heavy things
 - Wife is a Consultant
 - 2 kids – one of each (That's plenty)
 - Select-side Rugby player at UW-P

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Hunter Waldschmidt, PE
Ancillary Structure PM
 South Inspection Unit - MAD
 Maintenance Section

- WisDOT / BOS since 2021 (2021-2022)
- Education:
 - UW-Platteville (2014) BS Civil Engineering
- Main Job Responsibilities:
 - Ancillary Structures Maint./Inspection Program Management
- Interests / Expertise:
 - Drones, Bridge Construction
- Personal / Fun Facts:
 - 2lbs 2oz when I was born. Sure can't tell now.

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane, ship BUREAU OF STRUCTURES

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Brad Williams
Trans. Specialist Adv.
 South Inspection Unit - MAD
 Maintenance Section

- WisDOT / BOS since 2022 (1998)
- Education:
 - Sparta High School/MATC for Civil Tech
- Main Job Responsibilities:
 - Bridge and Ancillary Inspection
- Interests / Expertise:
 - Golf (interest, little expertise)
- Personal / Fun Facts:
 - Married with children

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane, ship BUREAU OF STRUCTURES

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Joel Maas
Inspection PM
 South Inspection Unit - WAU
 Maintenance Section

- WisDOT / BOS Since 2017 (2017-2022)
- Education:
 - Carroll University
 - B.S. Applied Physics
 - University of Wisconsin – Milwaukee
 - B.S. Civil Engineering
- Main Job Responsibilities:
 - Inspector, Utility Coordinator
- Interests / Expertise:
 - Rehabilitations
- Personal / Fun Facts:
 - I enjoy my Nintendo Switch, tennis and the Milwaukee Bucks

Icons: wheelchair, bicycle, car, bus, train, truck, boat, plane, ship BUREAU OF STRUCTURES

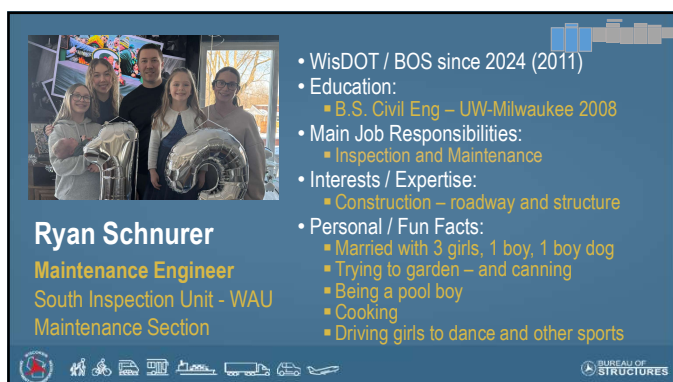
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Jason Zemke, PE
Ancillary Structure PM
 South Inspection Unit - WAU
 Maintenance Section

- WisDOT / BOS since 2022 (2006)
- Education:
 - Insert here...
- Main Job Responsibilities:
 - Insert here...
- Interests / Expertise:
 - Insert here...
- Personal / Fun Facts:
 - Insert here...

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Ryan Schnurer
Maintenance Engineer
 South Inspection Unit - WAU
 Maintenance Section

- WisDOT / BOS since 2024 (2011)
- Education:
 - B.S. Civil Eng – UW-Milwaukee 2008
- Main Job Responsibilities:
 - Inspection and Maintenance
- Interests / Expertise:
 - Construction – roadway and structure
- Personal / Fun Facts:
 - Married with 3 girls, 1 boy, 1 boy dog
 - Trying to garden – and canning
 - Being a pool boy
 - Cooking
 - Driving girls to dance and other sports

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Leah
Title
 South Inspection Unit - WAU
 Maintenance Section

- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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- WisDOT / BOS since 20xx
- Education:
 - Insert information here
- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
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- Personal / Fun Facts:
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Steven
 Title
 South Inspection Unit - WAU
 Maintenance Section



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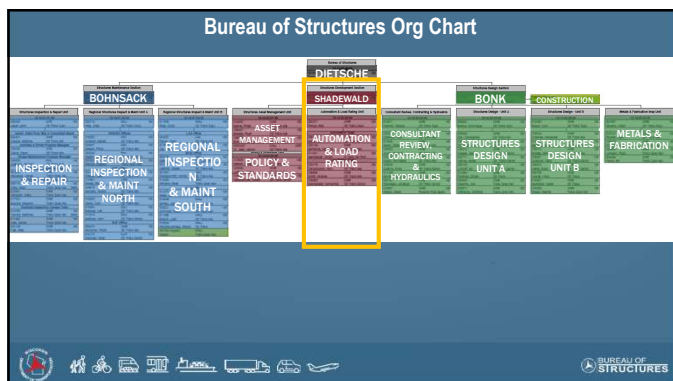
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- WisDOT / BOS since 20xx
- Education:
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- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here


Vacant
 Title
 South Inspection Unit - WAU
 Maintenance Section



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Danielle De Tennis, PE
Automation Engineer
Automation & Load Rating Unit
Development Section

- WisDOT / BOS since 2010
- Education:
 - Milwaukee School of Engineering
 - B.S. Architectural Engineering
 - M.S. Structural Engineering
- Main Job Responsibilities:
 - Develop software to automate bridge design and assist the other sections in BOS
- Interests / Expertise:
 - Tech Support on BOS Specific Software
 - Excel, Box, MicroStation, Civil 3D
- Personal / Fun Facts:
 - Married with two cats
 - Like to knit

BUREAU OF STRUCTURES

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Vinoth Manoharan
IS Technical Services
Automation & Load Rating Unit
Development Section

- WisDOT / BOS since 2021
- Education:
 - UW Madison:
 - B.S. Computer Science,
 - B.S. Math
- Main Job Responsibilities:
 - IT Needs Coordinator
 - Software Developer
- Interests / Expertise:
 - Tech Support, Troubleshooting
- Personal / Fun Facts:
 - Interned here before I became fulltime

BUREAU OF STRUCTURES

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Kelly Tomjanovich, PE
Bridge Rating Engineer
Automation & Load Rating Unit
Development Section

- WisDOT / BOS since 2012
- Education:
 - THE Ohio State University
 - B.S./M.S. in Civil Engineering (Structural)
- Main Job Responsibilities:
 - Oversight of state bridge rating program, OSOW permitting, structural reviews
- Interests / Expertise:
 - Bridge rating/analysis
 - SQL programming (writing reports to query data in HSI)
- Personal / Fun Facts:
 - Live in McFarland with husband Joe, pup Cooper (10), and baby Logan (1)

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David T. Nelson, PE
Structural Engineer
 Policy & Standards Unit
 Development Section

- WisDOT / BOS since 1977
- Education:
 - B.S.C.E. UW-Madison
- Main Job Responsibilities:
 - Maintain Bridge Manual & Standards
 - AASHTO Publication Coordination
- Interests / Expertise:
 - Concrete Structures
 - Barriers and Railings
- Personal / Fun Facts:
 - Enjoy family activities

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, ship, wind turbine, solar panel, leaf, recycling symbol, etc.

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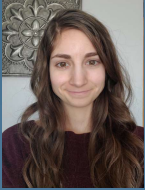
James Luebke, PE
Structural Engineer
 Policy & Standards Unit
 Development Section

- WisDOT / BOS since 2010
- Education:
 - UW Milwaukee
 - B.S./M.S. Civil Engineering (Structural)
- Main Job Responsibilities:
 - Maintain the Bridge Manual
- Interests / Expertise:
 - Retaining Walls
 - Accelerated Bridge Construction
- Personal / Fun Facts:
 - Enjoy volunteering on the Ice Age Trail and trail running.
 - 11-year-old active Border Collie (Winnie)

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, ship, wind turbine, solar panel, leaf, recycling symbol, etc.

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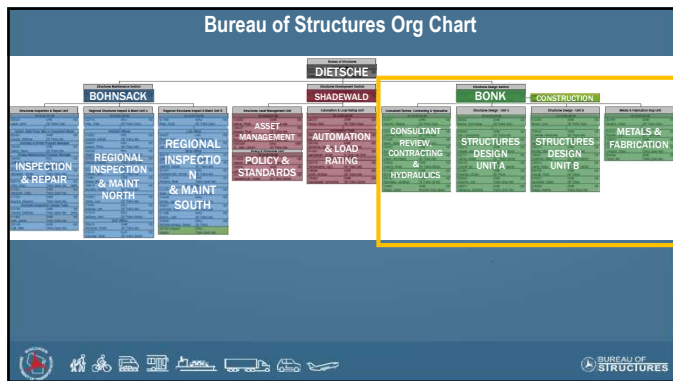
Stacie Hausserman
Structural Engineer
 Policy & Standards Unit
 Development Section

- WisDOT / BOS since 2016
- Education:
 - BS Civil Engineering – Michigan Technological University
- Main Job Responsibilities:
 - Design, Draft, Check new structures and rehabs
 - NE Region Liaison
- Interests / Expertise:
 - Stream Crossings, finding old plans (microfilm), examples
- Personal / Fun Facts:
 - Married, we have two cats and a dog
 - Enjoy live music, to paint, read, and garden

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, ship, wind turbine, solar panel, leaf, recycling symbol, etc.

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Aaron Bonk, PE
Design Chief
Design Section

- WisDOT / BOS since 2010
- Education:
 - BSCE, UW-Madison
- Main Job Responsibilities:
 - Manage & Coordinate the 4+ Design Units
- Interests / Expertise:
 - Design & Construction, Specifications, Leadership, Diversity/Equity/Inclusion
- Personal / Fun Facts:
 - Engaged to partner (Lua) with 4 kids (Nur-16, Isaiah-13, Theo-9, and Zaia-8)
 - Love to play golf

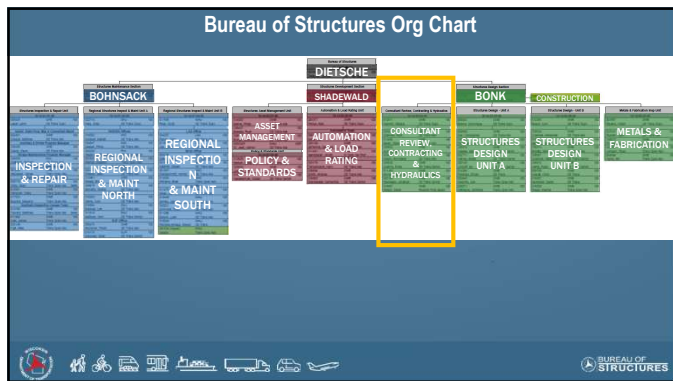
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Insert Name
Structures Construction
Program Manager
Design Section

- WisDOT / BOS since 20xx
- Education:
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- Main Job Responsibilities:
 - Structure Inspection & Repair
- Interests / Expertise:
 - Insert information here
- Personal / Fun Facts:
 - Insert information here

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Najoua Ksontini, PE
Supervisor
Consultant Review Unit
Design Section

- WisDOT / BOS since 1999
- Education:
 - BSCE UW - Madison
 - M.S. Civil & Env Engineering, Hydrology & Hydraulics- UW Madison
- Main Job Responsibilities:
 - Supervise the Consultant Review and Hydraulics Unit
- Interests / Expertise:
 - Mentoring staff
 - Hydrology
- Personal / Fun Facts:

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Ruth Coisman, PE
Structural Engineer
Consultant Review Unit
Design Section

- WisDOT / BOS since 2011
- Education:
 - UW-Eau Claire
 - UW-Madison
- Main Job Responsibilities:
 - Consultant Review – Preliminary
- Interests / Expertise:
 - Review all consultant preliminary plans
- Personal / Fun Facts:
 - Married (Grant) with two kids (Margaux & Gabriel)
 - Enjoy cooking & hiking

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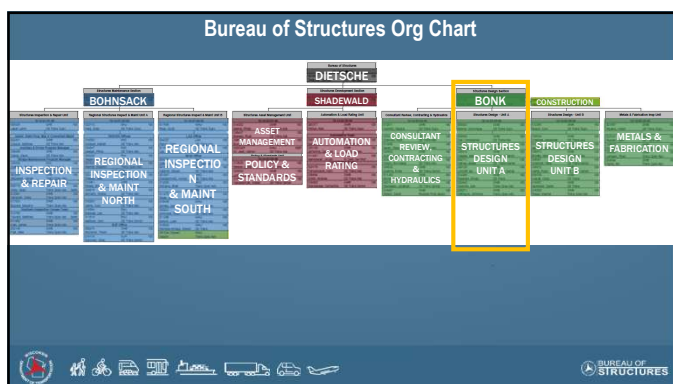


Sarah Wright
Records Program Associate
Consultant Review Unit
Design Section

- WisDOT / BOS since 2021
- Education:
 - AS - Computer Programming
- Main Job Responsibilities:
 - Record Keeping (e-submits, HSIS/ViewBridge, etc.)
 - General Support Activities
- Personal / Fun Facts:
 - Enjoy wilderness canoeing with my husband, John. We've done fly-ins into the Canadian interior and paddled out. No clocks or technology allowed on these trips :-)
 - Big Badger volleyball fan.
 - 17 years of my career was in IT Automation Security & IT Compliance.



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Dominique Bechle, PE
Supervisor
Design Unit "A"
Design Section

- WisDOT / BOS since 2016
- Education:
 - BSCE UW-Madison ... Go Badgers!
- Main Job Responsibilities:
 - Supervise the design unit – assign & review work; coordinate with DOT Regions, Consultants and Industry on various questions/topics related to structures
- Interests / Expertise:
 - Structure Design, Staff Development, Design & Detailing Process Improvement
- Personal / Fun Facts:
 - Mom of 2 boys, Oscar (15) and Oliver (13)
 - Identical twin
 - Love cooking, running, live music, and most of all adventuring with my husband and boys!



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Chris Doll, PE
Structural Engineer
 Design Unit "A"
 Design Section

- WisDOT / BOS since 2010
- Education:
 - B.S. Civil Engineering- UW-Madison
- Main Job Responsibilities:
 - Bridge and retaining wall design
- Interests / Expertise:
 - Structural Analysis and Behavior
- Personal / Fun Facts:
 - Married, 2 kids



76



Ann Thielmann, PE
Structural Engineer
 Design Unit "A"
 Design Section

- WisDOT / BOS since 2021
- Education:
 - BSCE UW-Madison
- Main Job Responsibilities:
 - Design, Draft, Check new structures and rehabs
 - Liaison for the Mason St/STH 54 bridge
- Interests / Expertise:
 - Stream Crossings, Rehabs
 - Construction Inspection
- Personal / Fun Facts:
 - Live in DeForest w/my husband and two dogs
 - Enjoy baking, golfing, reading and kickball




77



Isatou Ceesay
Structural Engineer
 Design Unit "A"
 Design Section

- WisDOT / BOS Since 2020
- Education:
 - National Taipei University of Technology
 - B.S Civil Engineering
 - National Cheng Kung University
 - M.S Structural Engineering
- Main Job Responsibilities:
 - Design, draft, and check structures such as bridges, box culverts, noise barriers, and retaining walls. Provide quantity calculations and cost estimate of all designs.
- Interests / Expertise:
 - Bridge Design
 - Box culverts
- Personal / Fun Facts:
 - Married with 5 kids
 - Enjoy eating out and taking vacations



78



- WisDOT / BOS since 2021
- Education:
 - University of Minnesota Duluth
 - B.S. Civil Engineering with structural emphasis
- Main Job Responsibilities:
 - Design, draft, and check plans for new or rehabilitated structures.
- Interests / Expertise:
 - Single span bridges, culverts
- Personal / Fun Facts:
 - Two cats (a Mother Millie and her kitten Minnie)
 - Taken a tour of the White House in Washington D.C.

Lexi Hanley
Structural Engineer
 Design Unit "A"
 Design Section



79



- WisDOT / BOS since 2021
- Education:
 - UW – Platteville
 - B.S. Civil Engineering, Structural Emphasis
- Main Job Responsibilities:
 - Design, drafting, and checking of various structures & structure plans
- Interests / Expertise:
 - Bridge Design
- Personal / Fun Facts:
 - Built my own personal PC
 - D&D enthusiast and a "forever DM"

Ian Lindloff
Structural Engineer
 Design Unit "A"
 Design Section



80

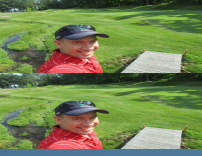


- WisDOT / BOS since 2026
- Education:
 - PhD Candidate in Civil Engineering – Structural Engineering
 - Marquette University
 - MSc in Civil Engineering – Earthquake Engineering
 - University of Tehran
- Main Job Responsibilities:
 - Design, draft, and check plans for new or rehabilitated structures
- Interests / Expertise:
 - Structural Analysis and Design!
- Personal / Fun Facts:
 - Enjoy playing the piano, working out, running, and last but not least reading *applied* philosophy!

Emad Farahani
Structural Engineer
 Design Unit "A"
 Design Section




81



Joel Huenink
Structural Detailer
Design Unit "A"
Design Section

- WisDOT / BOS since 2000
- Education:
 - UW-Sheboygan – Liberal Arts Summer Courses (1998-99)
 - MATC-Milwaukee – Civil Engineering Technology Associate's Degree (1998-2000)
 - UW-Madison – Engineering Courses (2000-2004)
- Main Job Responsibilities:
 - Drafting & Detailing Structure Plans
- Interests / Expertise:
 - Playing golf, Watching and cheering on my favorite Wisconsin Sports teams and traveling to different neat places in the United States
- Personal / Fun Facts:
 - I helped with the construction of the Brewers stadium when it was being built back in 2000 and I was once in the audience on "The Price is Right" back in 2012.



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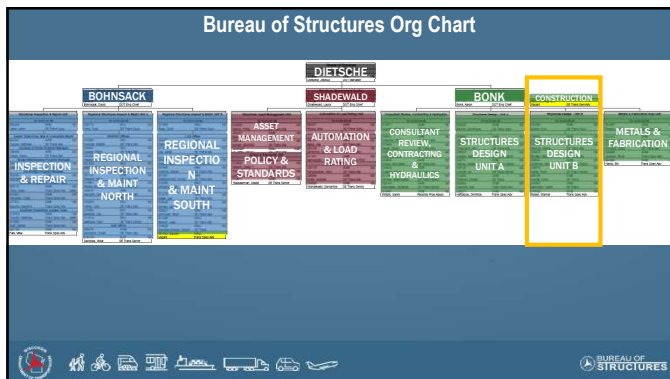


Dimitrios Haftoglou
Structural Detailer
Design Unit "A"
Design Section

- WisDOT / BOS since 2023
- Education:
 - Midlands Technical College (SC)
- Main Job Responsibilities:
 - Drafting / Detailing Structure Plans
- Interests / Expertise:
 - Started drafting in 2006, worked on Structural, Roadway, Civil construction plans.
- Personal / Fun Facts:
 - Married to Beth (2005), two kids Henry and Penny. Enjoy Soccer, Golf and College Football.



83



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Kyle Busch, PE
Supervisor
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2023
- Education:
 - BS, UW-Madison
 - MS, University of Texas at Austin
- Main Job Responsibilities:
 - Supervise design unit, review plans and estimates, coordination with DOT Regions and consultants.
 - Interests / Expertise: structural analysis, bridge design, load rating, bridge inspection
- Personal / Fun Facts:
 - Wife (Julia) is also a civil engineer.
 - Son (Isaac) born December 2022.
 - Love to hangout with our dog (Avett), he's an energetic hound-mix.
 - Enjoy biking, XC skiing, running, hiking

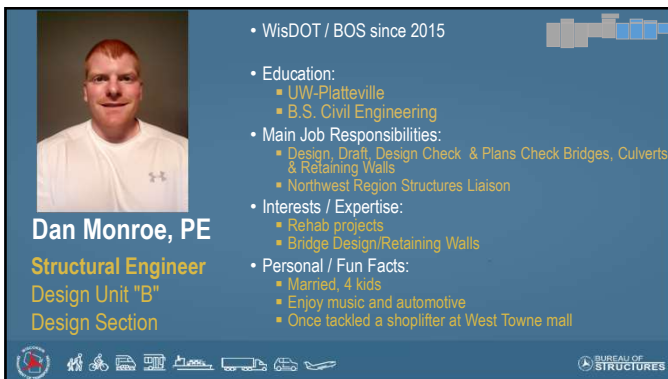
85



Alex Crabtree, PE
Structural Engineer
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2010
- Education:
 - Milwaukee School of Engineering
 - B.S. Architectural Engineering
 - M.S. Structural Engineering
- Main Job Responsibilities:
 - Design
- Interests / Expertise:
 - Structure Design, Ancillary structures: Sign structures & Traffic Signals
- Personal / Fun Facts:
 - Married with 2 kids

86



Dan Monroe, PE
Structural Engineer
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2015
- Education:
 - UW-Platteville
 - B.S. Civil Engineering
- Main Job Responsibilities:
 - Design, Draft, Design Check & Plans Check Bridges, Culverts & Retaining Walls
 - Northwest Region Structures Liaison
- Interests / Expertise:
 - Rehab projects
 - Bridge Design/Retaining Walls
- Personal / Fun Facts:
 - Married, 4 kids
 - Enjoy music and automotive
 - Once tackled a shoplifter at West Towne mall

87



Micah Brooks, PE
Structural Engineer
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2014
- Education:
 - UW-La Crosse (B.S. Physics)
 - UW-Madison (B.S. Civil Engineering)
- Main Job Responsibilities:
 - Structure design, plans drafting, QC of same
- Interests / Expertise:
 - Box culverts, sign structures, FRP
- Personal / Fun Facts:
 - Muay Thai enthusiast, cat owner, sci-fi & fantasy aficionado

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, wheelchair, stroller, car, train, bus, truck, boat, plane

BUREAU OF STRUCTURES

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Vista Shahriari, PE
Structural Engineer
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2022
- Education:
 - University of Wisconsin – Madison
 - Ph.D. in Structural Engineering (2021)
 - University of Tehran:
 - B.S. in Civil Engineering (2010)
 - M.S. in Structural Engineering (2012)
- Main Job Responsibilities:
 - Designing, Drafting, & Checking
- Interests / Expertise:
 - Structural Design/Analysis
 - Rehabs
 - Research / Learning
- Personal / Fun Facts:
 - Married (Afshin) with 1 kid (Raunika)
 - Enjoy cooking and baking

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, wheelchair, stroller, car, train, bus, truck, boat, plane

BUREAU OF STRUCTURES

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Ryan Harris, PE, SE
Structural Engineer
 Design Unit "B"
 Design Section

- WisDOT / BOS since 2021
- Education:
 - UW Milwaukee
 - B.S. Civil Engineering (2021)
 - M.S. Civil-Structural Engineering (2024)
- Main Job Responsibilities:
 - Designing, Drafting, & Checking
- Interests / Expertise:
 - Learning & Teaching
- Personal / Fun Facts:
 - Married, no kids yet

Icons: bicycle, wheelchair, stroller, car, train, bus, truck, boat, plane, wheelchair, stroller, car, train, bus, truck, boat, plane

BUREAU OF STRUCTURES

90



Chris Kusiak
Structural Engineer
Design Unit "B"
Design Section

- WisDOT / BOS since 2023
- Education:
 - UW-Platteville
B.S. Civil Engineering
 - Purdue University
M.S. Structural Engineering
- Main Job Responsibilities:
Designing, drafting and checking new roadway structures and rehab. projects
- Interests / Expertise:
Bridge design / bridge load rating, machine learning and big data

BUREAU OF STRUCTURES

91



Sarah McAllister
Structural Engineer
Design Unit "B"
Design Section

- WisDOT / BOS since 2025
- Education:
 - UW-Platteville, 2024
• B.S. Civil Engineering
- Main Job Responsibilities:
 - Designing, drafting, and checking new roadway structure and rehabilitation projects
- Interests / Expertise:
 - Concrete technologies, learning
- Personal / Fun Facts:
 - Getting married in June!
 - Love to be outside with our dog
 - Enjoy cooking and baking
 - Huge fantasy reader
 - Extremely crafty

BUREAU OF STRUCTURES

92

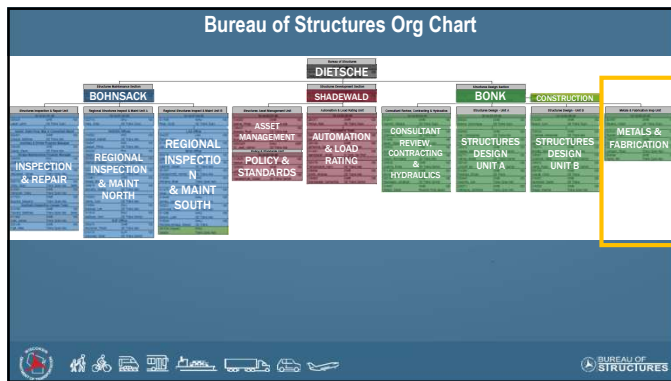


Warner Risser
Structural Detailer
Design Unit "B"
Design Section

- WisDOT / BOS since 2000
- Education:
 - Colorado Mountain College-Liberal Arts
 - MATC / Madison-Civil Engineering Technology
- Main Job Responsibilities:
 - Drafting / Detailing Structure Plans
- Interests / Expertise:
 - Expert Draftsman / Interest all things Bryan Adams
 - Typically the draftsman for the Most Complex Bridges
- Personal / Fun Facts:
 - Downhill Skiing, Listening to Music, Playing with guitars
 - Kentucky Derby Horses & Names and watching them race!

BUREAU OF STRUCTURES

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94

Kristin Revello, PE
Supervisor
Metals & Fabrication Inspection Unit
Design Section


- WisDOT / BOS since 2000
 - NE Region SET, 1998-1999, Design & Construction
 - NE Region PDS Design & Construction 2000-2001
- Education:
 - UW-Platteville
 - B.S. in Civil Engineering - Structural Emphasis
 - B.S. in Mathematics
- Main Job Responsibilities:
 - Structure fabrication and inspection program oversight
- Interests / Expertise:
 - Fabrication
 - Represent BOS on the WisDOT Prestressed Girder Plant Certification Review Team (CRT)
- Personal / Fun Facts:
 - I volunteer as a Firefighter and Advanced EMT

95

John Rublein, PE
Structural Engineer
Metals & Fabrication Inspection Unit
Design Section


- WisDOT / BOS since 2022
- Education:
 - BSCE UW-Madison 2001
- Main Job Responsibilities:
 - Concrete shop drawing review
- Interests / Expertise:
 - Bridges, Earth & Water Retaining Structures, Hydraulics, Materials
- Personal / Fun Facts:
 - I enjoy bicycling and music

96



- WisDOT / BOS since 2014
- Education:
 - B.S. Civil Engineering – University of Puerto Rico
 - M.S. Civil Engineering – UW Madison
- Main Job Responsibilities:
 - Review shop drawings for steel structures and components, fabrication and inspection procedures, repairs and modifications
 - BOS Fabrication Library management
- Interests / Expertise:
 - Steel bridges, Fabricated Bridge Components, Materials
- Personal / Fun Facts:
 - I enjoy making attempts at rock climbing and biking

Carla Principe, PE
Structural Engineer
 Metals & Fabrication Inspection Unit
 Design Section



97



- WisDOT / BOS since 2018
- Education:
 - Weld Inspection Training Wisconsin Welding Services Green Bay
- Main Job Responsibilities:
 - Provide Quality Assurance Inspections at fabricators facilities
- Interests / Expertise:
 - Fabrication, Inspection, Welding
- Personal / Fun Facts:
 - Ranching, Hunting, Fishing , Softball

Ryan Janssen, CWI
Structures Fab Inspector
 Metals & Fabrication Inspection Unit
 Design Section



98




- WisDOT / BOS since 2023
- Education:
 - South Branch Valley Technical Center-Combination Welding (93-94)
 - US Navy-Builder (94-99)
- Main Job Responsibilities:
 - Steel Fab Insp, Welding Inspection, NDT
- Interests / Expertise:
 - Welding, NDT
- Personal / Fun Facts:
 - Four overseas deployments to various Mediterranean and South Pacific islands.

Bill Hardy, CWI
Structures Fab Inspector
 Metals & Fabrication Inspection Unit
 Design Section



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Trans 213, WisAMS, and the Local Bridge Program


Laura Shadewald
WisDOT Structures Development Chief

Structural Engineers Symposium
May 26, 2026

1

Why Change Trans 213?


- What is Trans 213?
 - State Statute 84.18
 - Administrative Code – Defines the Local Bridge Program
 - Eligibility
 - Entitlement
 - Local Bridge Program
 - "...relating to the method of determining eligibility for funding the acceleration of the reconstruction or rehabilitation of seriously deteriorating local bridges."



2

Why Change Trans 213?

- Aim for "right work, right time" to get as much life out of a bridge as possible
 - "Deficient bridge" requirement makes rehab work very difficult
 - Must be NBI 4 (poor) or less
 - Sufficiency rating is an outdated measure (eliminated in 2012)
 - Doesn't fully capture bridge condition or needed work
 - Data used to calculate is obsolete
 - "10-year rule" is no longer a Federal rule
 - Could make preservation work difficult




3

Why Change Trans 213?

- Rehabilitation vs. Replacement - Trans 213.03 (2)
 - Sufficiency Rating (SR) < 80 = Rehab eligible
 - SR < 50 = Replacement eligible

(2) REPLACEMENT AND REHABILITATION. (a) An eligible local bridge project under sub. (1) may be for replacement of the bridge if the bridge has a current sufficiency rating of less than 50.

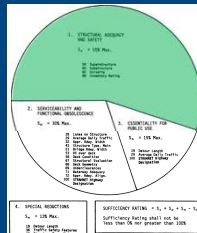
(b) An eligible local bridge project under sub. (1) may be for rehabilitation of the bridge if the bridge has a sufficiency rating of 80 or less. An engineering study shall be undertaken and funded independently by the eligible applicant that indicates that any rehabilitation would be cost effective, would extend the life of the bridge by at least 10 years, and would correct all deficiencies. If conditions exist that would prevent the completed improvement from correcting all deficiencies, the department may determine if the proposed project is eligible based on safety and the public interest.




4

Why Change Trans 213?

- SR is 55% based on NBI condition rating
 - Element ratings not included
- 45% other items
 - # of lanes, roadway width, detour length, etc.
- Essentially a replacement-only program
 - Criteria makes rehab, preservation very difficult
 - For rehab, SR < 80, but also deficient
 - At that point, most rehab options aren't appropriate






5

Why Change Trans 213?


- Rehab and preservation in addition to replacement work
 - Understand funding, other considerations don't always allow for the "ideal" treatment
 - Do the best we can – don't want to throw away usable life
 - Car analogy
- Sufficiency Rating-based eligibility criteria sometimes stands in the way of this goal



6

Overview of the New* Trans 213

- Goals:
 - Do the right work on the right bridges at the right time
 - Remove barriers for local owners to submit needed bridge work
- Still need to connect Trans 213 to State Statute 84.18
 - 1st eligibility screening
 - "The bridge has observed deficiencies documented in the most recent inspection."




7

Overview of the New* Trans 213

- 2nd eligibility screening
 - "The bridge meets the criteria noted in Table 1 or Table 2 below."

Deck NBI Rating	Preservation		Rehabilitation		Superstructure, Substructure, or Culvert NBI Rating	Rehabilitation		Reconstruction	
	9	8	7	6		9	8	7	6
9	X				9	X			
8	X				8	X			
7	X				7	X			
6	X		X		6	X		X	
5			X		5			X	
4			X		4			X	
3			X		3			X	
2			X		2			X	
1			X		1			X	
0			X		0			X	



8

Overview of the New* Trans 213

- 3rd eligibility screening: Bridge Project Scope Eligibility List
 - Bridges on list can be submitted for funding consideration


Structure #	Region	County	Owner	Municipality	Feature On	Feature Under	Deck Area (LF)	Deck NBI	Superstructure NBI	Substructure NBI	Culvert NBI	Proposed Work Concept
B020023	NW	CLATSOP COUNTY	T-MADEIRA		THE GO	INDIAN CREEK	405	5	4	4	4	REPLACE STRUCTURE
B020225	NW	BARBER COUNTY	C-CHESTER		CHETTER RIVER		4505	5	4	5	5	NO WORK CONCEPT IS PROPOSED
B040018	NW	BATTFIELD COUNTY	T-MAHARAGON		MAHARAGON LAKE		1545	5	6	4	4	NO WORK CONCEPT IS PROPOSED
B040038	NW	BATTFIELD COUNTY	T-MAHARAGON		ELSON RD	WHITE RIVER	2472	6	6	4	4	NO WORK CONCEPT IS PROPOSED
B040413	NW	BATTFIELD COUNTY	T-MAHARAGON		SOUTH SHORE RD	ELLS GARDEN LAKE	975	3	3	4	4	REPLACE STRUCTURE
B050008	NE	BROWN COUNTY	T-NEW DENMARK		MB	NESHOTA RIVER	2335	4	4	5	5	REPLACE STRUCTURE
B050018	NW	BROWN COUNTY	T-ROSBART		FR-HULCKERT RD	DUCK CREEK	5625	4	8	5	5	CONCRETE OVERLAY

B050008

REPLACE STRUCTURE

B050026

CONCRETE OVERLAY



9

Overview of the New* Trans 213

- 3rd eligibility screening: Bridge Project Scope Eligibility List
 - Bridges not on list can be submitted, as long as they meet the 1st & 2nd eligibility screening **AND** with engineering study justifying work
 - Reviewed by WisDOT Bureau of Structures

"If the bridge in question does not appear on the list as replacement-eligible, the local owner may submit an application with a replacement scope, but it shall be accompanied by an engineering study providing justification. The justification should consider the timing of the proposed project, consideration of alternative scopes, safety of the traveling public, maintaining serviceability of the structure, and cost-benefit of the proposed scope versus other viable options."



10

Overview of the New* Trans 213

- REVIEW - three-step screening:
 1. Must have observed deficiencies (cracking, rust, etc.)
 2. Bridges condition meets the requirements of the eligibility tables
 3. Bridge has a work action on the bridge project scope eligibility list
 - If a bridge only meeting step 1 and 2, can still submit with an engineering study to justify the work



11




Bridge Eligibility List: How is it developed?

12

12

Current Bridge Asset Management

- To assist with planning and programming bridge work, WisDOT developed the Wisconsin Structures Asset Management System (WiSAMS)
 - WiSAMS is a tool, computer software
 - Developed, maintained by WisDOT engineers
- Idea was to use products off of previous efforts
 - Use bridge inventory data and condition data combined with preservation policy in order to systematically determine bridge preservation, rehabilitation, and replacement needs at a network-level.



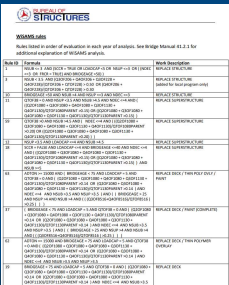
13


Current Bridge Asset Management

Philosophy behind WiSAMS

- Replace Structure
- Replace Superstructure
 - (often defaults to Replace Structure)
- Replace Deck
- Thin Polymer Overlay
- Concrete Overlay

Sequencing



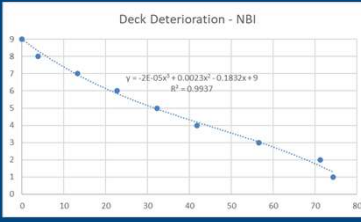



14

Current Bridge Asset Management

Projecting future condition using deterioration curves

- Project forward one year, run again
- Project forward two years, run again
- And so on...
- Look at a 6-year window for eligibility





15

2025 Local Program Solicitation

- DRAFT Application Numbers
 - 128 applications
 - 78 replacements
 - 50 rehabilitation
 - 5 TPO



19

What's my role as a Consultant?

- Quality Inspections
- Locals Familiarity
 - Ensure recommendations align with Bridge Manual Policy
- Reach out to BOS with Questions



20



Questions?

Laura.Shadewald@dot.wi.gov
608-267-9592

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Thank you!

Structural Engineers Symposium

May 26, 2026

Standard Specification ReOrganization - Materials

Myungook (MK) Kang
WisDOT Structural Engineers Symposium
May 26th 2026



1

Material Specification ReOrganization

- Why are we doing this?
 - Materials specs spread across multiple locations
 - Standard Specification, CMM, APL guidance etc.
 - Materials specs are in x.3 Construction
 - What if all materials specs are consolidated into one chapter?
- Who are doing this?
 - Collaborate with multiple groups - BTS, BOS, Tech Teams



2

Existing specification

- 505 Steel Reinforcement
 - 505.1 Description
 - 505.2 Materials
 - Bar Steel Reinforcement
 - High Strength Bar Steel Reinforcement
 - Coated High-Strength Bar Steel Reinforcement
 - Welded Steel Wire
 - Dowel and Tie Bars
 - Bar Couplers
 - 505.3 Construction (Stay)
 - 645.4 Measurement (Stay)
 - 645.5 Payment (Stay)

505 Steel Reinforcement

505.1 Description
This section describes furnishing and placing bar steel, high-strength bar steel or coated high-strength bar steel.

505.2 Materials
505.2.1 General
Use deformed reinforcing bars unless the contract specifies otherwise.
Unless the plans show otherwise or the special provisions specify otherwise, use the deformed type for all bar steel, all high-strength bar steel, and all coated high-strength bar steel reinforcement. If plain, round steel reinforcement is specified, conform to ASTM A675, grade 60.
Use fabrication tolerances for straight and bent bars specified in Subsection 4.3, Tolerances, of the American Concrete Institute Committee 315, in the American Concrete Institute Detailing Manual.
Unless the contract specifies otherwise, submit a manufacturer's certified report of test or analysis showing the reinforcement conforms to the specifications to the engineer before incorporating the reinforcement into the work.

505.2.2 Bar Steel Reinforcement
Conform to ASTM A675, type S or type W.

505.3 Construction
505.3.1 General
Store reinforcement above ground on platforms, skids, or other supports. Protect from mechanical injury and deterioration from exposure. Store epoxy-coated reinforcement on wooden cradling and handle without dragging or dropping using padded or non-metallic slings.

505.4 Measurement
The department will measure the Bar Steel Reinforcement bid items by the pound acceptably completed. The department will compute the bar weight from the nominal weights for corresponding sizes or different sizes in ASTM A675. The department will not measure the following:

505.5 Payment
The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
505.0100	Bar Steel Reinforcement Structures	LB
505.0400	Bar Steel Reinforcement HS Structures	LB
505.0600	Bar Steel Reinforcement HS Coated Structures	LB
505.0900-0919	Bar Couplers (each)	EACH

3

New Specification

- 505 Steel Reinforcement
 - 505.1 Description
 - 505.2 Materials
 - Only with links to materials
 - 505.3 Construction (Stay)
 - 645.4 Measurement (Stay)
 - 645.5 Payment (Stay)

505 Steel Reinforcement

505.1 Description

1) This section describes furnishing and placing bar steel, high-strength bar steel or coated high-strength bar steel.

505.2 Materials

1) Provide materials as specified in:

Bar Steel Reinforcement	710.2
Reinforcement Coating	710.3
Welded Steel Wire Fabric Concrete Reinforcement	710.4
Dowel Bars and Tie Bars	710.5
Bar Couplers	710.6

505.3 Construction

505.3.1 General

1) Store reinforcement above ground on platforms, skids, or other supports. Protect from mechanical injury and deterioration from exposure. Store epoxy-coated reinforcement on wooden cribbing and handle without dragging or dropping using padded or non-metallic slings.

2) Cover epoxy-coated bars in storage, or placed in a bridge deck mat, with an opaque engineer-approved material to prevent cumulative exposure to sunlight for more than 2 months before being embedded in concrete. Include portions of partially embedded bars left exposed between construction stages.

3) Mark reinforcement to facilitate inspection and checking. Ensure reinforcement is free from detrimental dirt, dust, paint, oil, or other foreign material when placed in the work. The engineer will not reject reinforcement with rust, seams, surface irregularities, or mill scale if the weight, dimensions, cross-sectional areas, and tensile properties of a hand wire-brushed test specimen conform to [AASHTO M31](#).

4) The contractor may field cut reinforcement by sawing, using abrasive cut-off blades, or flame cutting. Do not flame cut epoxy-coated reinforcement.

505.3.2 Bending

4



New specification

- 710.1 Prestressed Reinforcement
 - 710.2 Bar Steel Reinforcement
 - 710.3 Reinforcement Coating
 - 710.4 Welded Steel Wire Fabric Concrete Reinforcement
 - 710.5 Dowel Bars and Tie Bars
 - 710.6 Bar Couplers
 - No Construction/Measurement/Payment

710.1 Prestressed Reinforcement

1) Provide high-tensile strength prestressing conforming to [ASTM A416](#), grade 270. Use high tensile strength, 7-wire strands of the nominal diameter the plans show.

2) Document quality control testing for high tensile strength prestressing according to [AASHTO T244](#) at a frequency of one test per hour.

710.2 Bar Steel Reinforcement

710.2.1 General

1) Use deformed reinforcing bars unless the contract specifies otherwise.

2) Unless the contract specifies otherwise, use deformed type for all bar steel, high-strength bar steel, and all coated high-strength bar steel reinforcement.

3) Use fabrication tolerances for straight and bent bars as specified in Subsection 4.3, Tolerances, of the American Concrete Institute Committee 315, in the American Concrete Institute Detailing Manual.

4) Provide a 5-foot cut sample piece to the engineer for each bar size that exceeds 50,000 pounds on the contract.

5) Provide bar steel reinforcement conforming to table 710-2.

MATERIAL	TEST METHOD	CONFORMANCE
Bar Steel Reinforcement	AASHTO M31	type S or type W
Bar Steel Reinforcement - Plain, Round	ASTM A675	grade 60
High-strength Bar Steel Reinforcement	AASHTO M317 ⁽¹⁾ ASTM A706 ⁽¹⁾	grade 60, type S or type W grade 60
Coated High-strength Bar Steel Reinforcement ⁽²⁾ or ⁽³⁾	AASHTO M31	grade 60, type S or type W

710.3 Reinforcement Coating

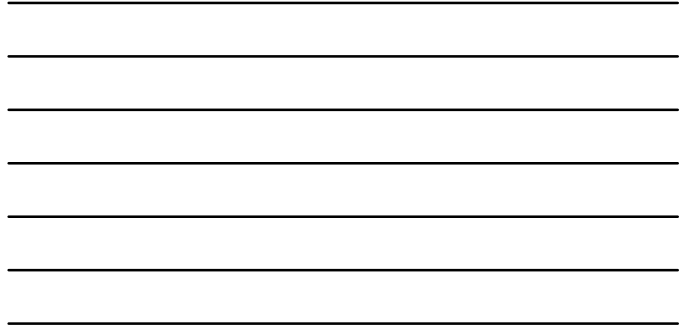
710.3.1 Fusion-bonded Powder

1) Provide fusion-bonded powder from the [AEL](#), conforming to [ASTM A775](#) when coating high-strength bar steel reinforcement, tie bars and bar couplers. Apply the coating in a CRSI-certified epoxy coating plant.

710.3.2 Two-part Epoxy Resin (Field Repair)

1) Provide two-part epoxy resin conforming to ASTM A775 when making field repairs to high-strength bar steel reinforcement, tie bars, and bar couplers. Limit use to the repair of damaged epoxy-coated materials only.

5





Specification – Bridges	
Existing Specifications	New Specification
• 701 General QMP Requirement	• 700 General Materials
• 710 General Concrete QMP	• 706.1 General Concrete Requirement
• 715 QMP Concrete Pavement, Cast-in-Place Barrier and Structure	• 706.3 Concrete Category II (Structures) – for structure only
• 501 Concrete	• 706.1 General Concrete Requirements, • 707 Portland Cement, • 708 Supplementary Cementitious Materials, • 709 Concrete Chemical Admixtures, Concrete Curing Compounds and Materials
• 502 Concrete Bridges	• Various
• 503 Prestressed Concrete Members	• 712.9 Prestressed Concrete Members
• 504 Culverts, Retaining Walls, and End Walls	• 706.3 Concrete Category II (Structures) – for culverts and retaining walls only • 706.10 Concrete Category IX (Miscellaneous Concrete) – for end walls
• 509 Structure Repair	• 706.6 Concrete Category V (Concrete Bridge Deck Overlay) • 706.7 Concrete Category VI (Concrete Structure Repair) • 706.12 Mortar and Grout (Miscellaneous) – for grout

6



AASHTOWare Project (AWP) - Construction and Materials Module

- Why are we doing this?
 - Web-based enterprise system
 - One stop shop for all material tracking and reporting systems
 - MTS, MRS, MIT etc. to AWP-Project
 - How AWP-Materials related to the new specification?
 - Digitize the new spec book into the AWP
 - Allows real-time tracking of compliant materials

10

Timeline of Implementation

- Three Pilot projects in 2026
- More pilot projects in 2027
- Full implementation
 - 2028 or after 2028
- [New Specification](#) in Roadway Standard

Roadway standards



- Structure and roadway resources
- Roadway standards
- Facilities development manual (FDM)
- Standard detail drawings (SDC)
- Standard specifications (Spec)
- Construction and materials manual (CMM)
- Construction notes
- Contract administration
- Major project documentation

- Facilities development manual (FDM)
- Standard detail drawings (SDC)
- Standard specifications (Spec)
- Construction and materials manual (CMM)
- Manual of test procedures (MOTP)
- Construction notes
- Contract administration
- Major project documentation


2026 Specification Reorganization Pilot Edition
2026 Reorganized Pilot Specification (PDF Download, October 17, 2025)

Related Information

- Subscribe to email update service
- Disadvantaged Business Enterprise (DBE) Update - 10/29/25







11



Thank You!

Questions?



12

BOS Initiatives/Policy & Standards Updates - Open Railings

James Luebke
 WisDOT Policy and Standards Engineer

WisDOT Structural Engineers Symposium
 Madison, WI
 5-26-2026



1

Open Railings

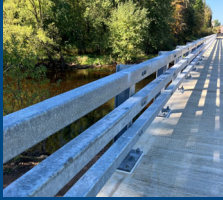

- Overview:
 - Potential Benefits/Realized Challenges
 - Background
 - Case Study
 - Current Policy
 - Design Considerations




2

Open Railings


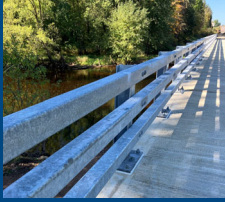
- Potential Benefits:
 - Aesthetics
 - Drainage
 - Snow removal
 - Improved sight distance

3

Open Railings


- Potential Benefits:
 - Aesthetics
 - Drainage
 - Snow removal
 - Improved sight distance



4

Open Railings

- Potential Benefits:
 - Aesthetics
 - Drainage
 - Snow Removal
 - Improved Sight Distance



5

Open Railings

- Realized Challenges:
 - Edge Deterioration
 - Railing Installation
 - Life-Cycle Costs
 - Repairability



6

Open Railings


- Realized Challenges:
 - Edge Deterioration →
 - Railing Installation
 - Life-Cycle Costs
 - Repairability




7

Open Railings

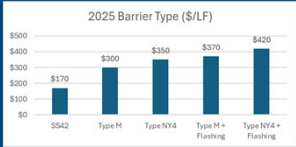
- Realized Challenges:
 - Edge Deterioration
 - Railing Installation →
 - Life-Cycle Costs
 - Repairability

8


Open Railings

- Realized Challenges:
 - Edge Deterioration
 - Railing Installation
 - Life-Cycle Costs →
 - Repairability



Barrier Type	Cost (\$/LF)
SS42	\$170
Type M	\$300
Type NY4	\$350
Type M + Flashing	\$370
Type NY4 + Flashing	\$420

SS Flashing (new to repair): \$50/LF to \$190/LF (2025)



9

Open Railings



- Realized Challenges:
 - Edge Deterioration
 - Railing Installation
 - Life-Cycle Costs
 - Repairability



10

Open Railings



- Policy Background:
 - WBM – July 2013 - For all new bridge plans, Traffic Railings placed on structures with a design speed exceeding 45 mph shall be solid concrete parapets.
 - Memo – August 2013 - Use of the open rails will not require pre-approval. However, we strongly encourage to consider the benefits of concrete parapets.
 - WBM – January 2014 - Traffic Railings placed on state-owned and maintained structures (Interstate Highways, United States Highways, State Trunk Highways) with a design speed exceeding 45 mph shall be solid concrete parapets.



11

Open Railings



- Flashing Background:
 - Used "Skirting" on past projects to protect existing deteriorated edges
 - 2016 – Fall Maintenance Meeting – Discussed ways to protect EOD
 - 2018 - New Standard 17.03 – Edge of Deck Flashing: Details for stainless steel flashing attachment to the edge of existing or new decks with open rails. Use of this detail is at the discretion of the Region's Bridge Maintenance Engineer.
 - 2022 - Contractors shared concerns about the sequence related to placement of the flashing (after protective surface treatment is applied and limited access after falsework removed).



12

Bridge Flashing



- Realized Challenges:
 - Only addresses deterioration
 - Adds time and resources
 - Additional railing costs
 - Limits Inspections
 - Some quality issues (maintenance item)
 - Weak Usage Policy – “Contact Region Bridge Maintenance Engineer”
 - Susceptible to high-water damage
 - Unknown long-term effectiveness


13

Bridge Flashing

- Advertised

Most Attractive Angle and Photo Found



14

Bridge Flashing

- Advertised




- Reality






Least Attractive Angle and Photo Found



15

Case Study



- Structure:
 - 1987 – New Bridge with open railings
 - 45" PS Girders, 70-ft structure
 - S.T.H. over Waterway, RDS=60 mph, AADT 2,000
 - 1.1% Longitudinal Slope with 6-ft shoulders



16

Case Study



- Timeline:
 - 1987 – New Bridge
 - < 2015 – Added Galvanized skirt (flashing)
 - 2015 – Deterioration Noted (CS2 and CS3)



17

Case Study


- Timeline:
 - 1987 – New Bridge
 - < 2015 – Added Galvanized skirt (flashing)
 - 2015 – Deterioration Noted (CS2 and CS3) (28 yrs)
 - 2019 – New Deck with 42SS Barriers (32 yrs)



18

Open Railings


- Current Policy:
 - Open railings shall be avoided on all projects
 - Open railings not allowed:
 - On NHS roadways
 - All roadways over state-owned and maintained structures (IH, US, STH)
 - All roadways over railroad crossings
 - On prestressed box girder bridges



19

Open Railings

- Design Considerations:
 - Open railings shall be avoided on all projects
 - Review drainage conditions for concrete parapet usage
 - Adjust the profile for drainage (0.5% preferred and 0.3% minimum)
 - Add floor drains
 - Use of open railings for snow removal operations is not sufficient justification.






20

Open Railings

Closing Remarks:

- Based on the realized challenges, does the Client/The Owner want Open Railings?
- Open railings shall be avoided on all projects. In some cases, open railings are not allowed. See WBM Chapter 30.






21

Thank You



22



Structural Reviews & Load Ratings

Alex Pence, PE, SE
 Supervisor – Automation & Load Ratings
 Bureau of Structures
 May 26, 2026

1

Why Load Ratings Matter


 Heavier Vehicles on Older Bridges	 Posting and Restrictions	 Maintenance and Rehab Needs	 Issuing OSOW Permits
---	--	---	--



2

Load Rating Events

Design	Initial As-Built	Inspection-Triggered	Scoping	Construction
OSOW Evaluation	Regulatory Change	Posting Refinement	Quality Assurance	Software or Methodology Migration



3

Today's Load Rating Topics



Inspection Findings & Structural Reviews



Load Rating Submittals



Help with Low Load Ratings





4


Inspection Findings & Structural Reviews




1

5

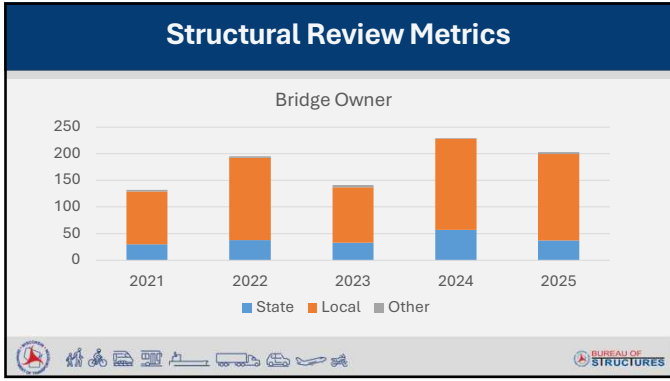
Structural Review Process

- **When is a Structural Review required?**
 - Load Rating potentially affected
 - CS4 deterioration/damage in primary load carrying members
- **Who Performs Structural Review?**
 - Inspector (if qualified)
 - Contact WisDOT Load Rating Engineer
 - Contact Consultant Professional Engineer
- **Completion Timeline**
 - 60 Days from Inspection Date

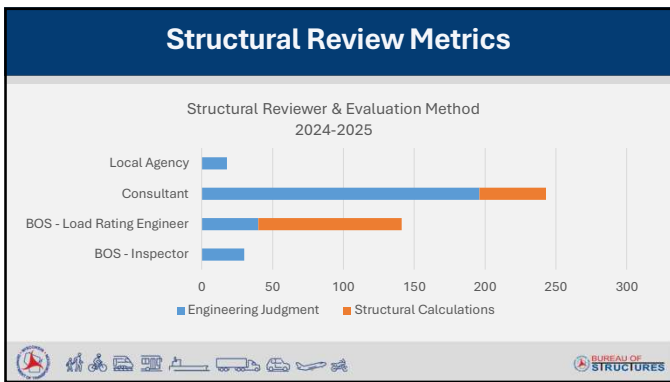


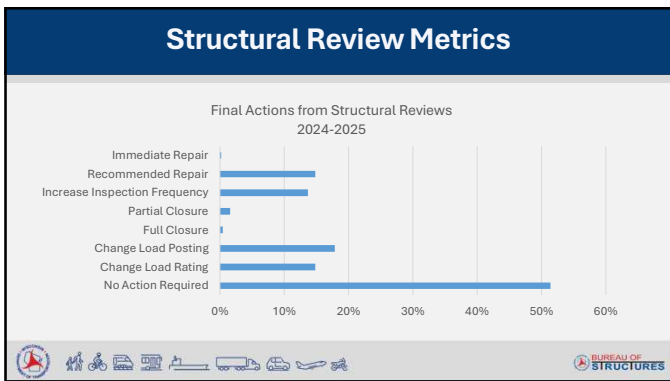
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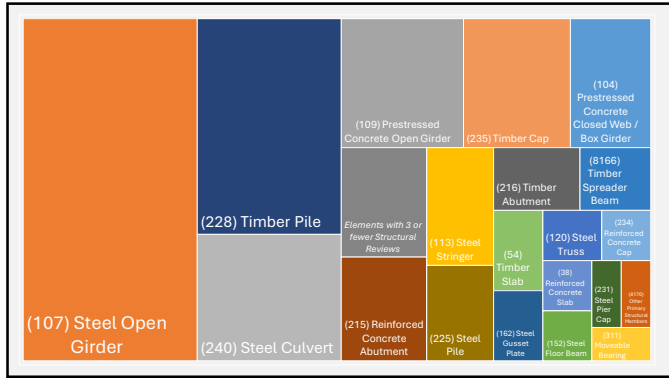
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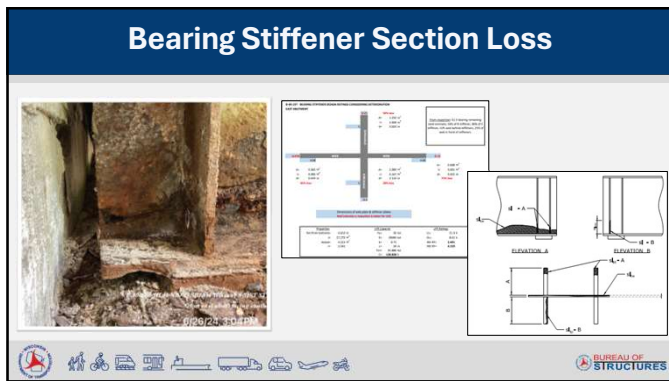
9



10



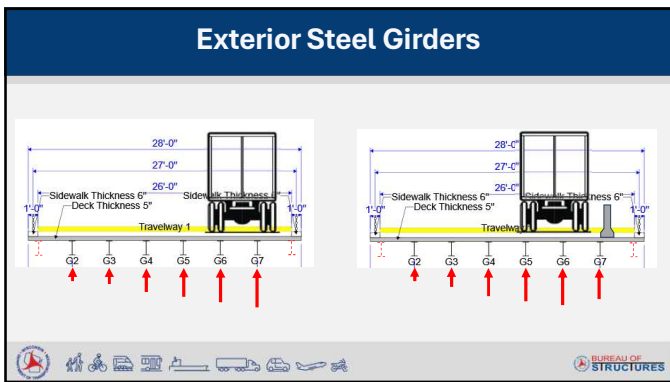
11



12



13



14



15

Timber Decay



The slide features two photographs of timber structures showing decay. The left photo shows a wooden beam with a date stamp '1932 04.27 11.29'. The right photo shows a cross-section of a decayed timber post. A small graph is visible in the bottom right of the image area. The slide footer includes the Wisconsin Department of Transportation logo, icons for various transportation modes, and the 'BUREAU OF STRUCTURES' logo.

16

Metal Culverts



The slide contains two photographs of metal culverts. The left photo shows the interior of a culvert with water and debris. The right photo shows the exterior of a culvert opening. The slide footer includes the Wisconsin Department of Transportation logo, icons for various transportation modes, and the 'BUREAU OF STRUCTURES' logo.

17

Concrete Slab Edges


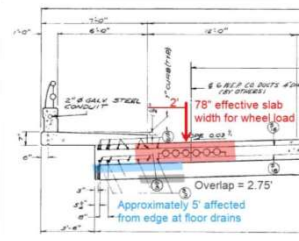
- Common for Older Bridges w/ Open Rails
- CS4 Spalling on Concrete Slab
 - Not automatic Structural Review
 - When to request one?
- Controversial code application
 - Overly conservative wheel load distribution?
 - Exterior Slab Strip – include in load rating?
 - Travel within striped lanes?
- Shoulder Closure vs. Posting
- Repair Options






The slide includes a photograph of a concrete slab edge showing spalling. The slide footer includes the Wisconsin Department of Transportation logo, icons for various transportation modes, and the 'BUREAU OF STRUCTURES' logo.

18

Concrete Slab Edges

19

Concrete Slab Edges





Spalling at rebar splice or end anchorage zones






20

Concrete Spalling & Cracking




Pier Caps



Prestressed Girders







21

Impact Damage

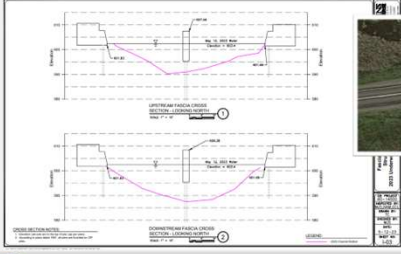
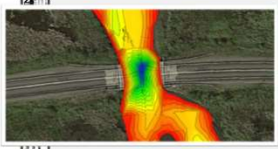










22

Scour








23

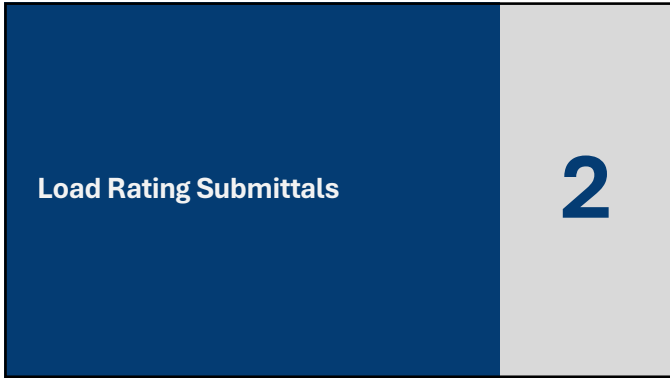
Rerate List

Avg. Annual Tally of Inspection-Triggered Load Rating Reviews

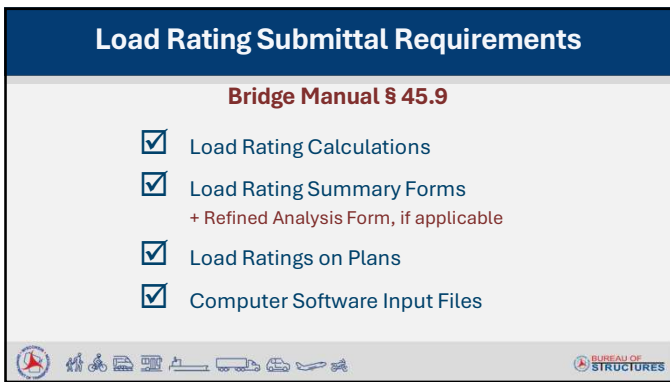
Inspection Trigger	State	Local
Structural Reviews	50	170
Rerate Box Checked	110	210
SNBI Component Rating Reduction (Super/Sub/Culvert < 5, Deck < 4)	30	170
Initial Inspections	90	130
Combined	270	520

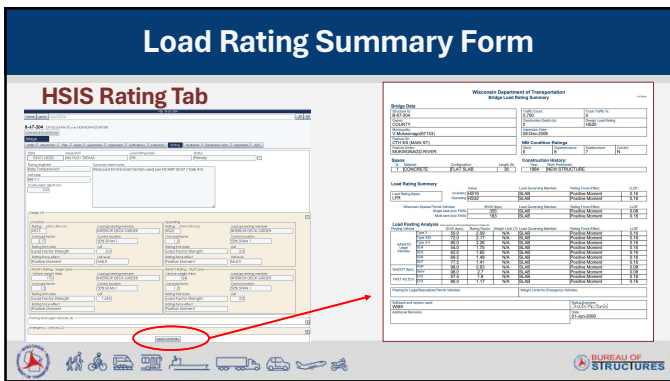
24



25



26








27

Load Rating Summary Form

When do posting / emergency vehicles need to be included?

Vehicles	Inventory	Operating
Emergency Vehicles	HS20 RF < 1.0 HL93 RF < 0.9	---
SHVs	---	HS20 RF < 1.3 HL93 RF < 1.0
Other Posting Vehicles	---	HS20 RF < 1.0 HL93 RF < 1.0






28

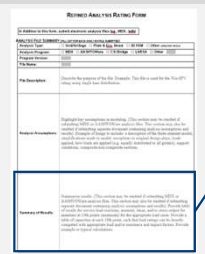
Load Rating Summary Form

- New Form Pending (w/ July 2026 Bridge Manual Updates)
 - Conditional Formatting for Required Posting Vehicle Inclusion
 - Clear Roadway Width
 - Span Continuity
 - Deck Interaction
 - Controlling Location
 - Live Load Factor
 - Live Load Distribution Level (Single / Multi-Lane)
 - Limit State
 - PE License No.

29

Submittals for Refined Analysis






MBE C6A.3.3

When a refined method of analysis is used, a table of distribution factors for extreme force effects in each span should be provided in the load rating report to aid in future load ratings.

Summary of Results:

Summarize results. (This section may be omitted if submitting MDX or AASHTOWare analysis files. This section may also be omitted if submitting separate document containing analysis assumptions and results). Provide table of results for service load reactions, moment, shear, and/or stress output for members at 10th points (minimum) for the appropriate load cases. Provide a table of capacities at each 10th point, such that load ratings can be directly computed with appropriate load and/or resistance and impact factors. Provide example or typical calculations.

30

Computer Software	
Load Rating Software used by BOS	
Steel Girders / Floor Systems	AASHTOWare BrR, SIMON, MDX
Prestressed Concrete Girders	In-House (WiBS), BrR
Reinforced Concrete Slabs	In-House (WiBS), BrR
Steel Trusses	BrR
Concrete Box Culverts	BrR
Timber Slabs / Girders	BrR
Finite Element Analysis	CSI Bridge, RISA
Other	LEAP/OpenBridge, Mathcad / Excel

31

- | Computer Software |
|---|
| <ul style="list-style-type: none"> • BOS does not require consultants to use specific software • Allows for independent evaluation and QA/QC • Software output reports included in calculation package • Software input files should be submitted |

32

- | Special Cases |
|--|
| <ul style="list-style-type: none"> • Mixed Rating Methods <ul style="list-style-type: none"> ▪ Widening with original portion in LFR, new portion in LRFR ▪ Submit multiple Load Rating Summary Forms ▪ Report both on plans • Staged Construction <ul style="list-style-type: none"> ▪ Satisfy load rating requirements for each construction stage ▪ Shall be included in calculations submittals ▪ No explicit requirements for Load Rating Summary Form or Plans |

33


Help with Low Load Ratings

3

34

Discrepancies vs. Previous Load Ratings

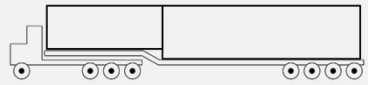

- Investigate discrepancies and ensure proper QC
 - Load rating for minor changes → Independent QA/QC opportunity
- Potential reasons:
 - Software differences
 - Method or policy differences
 - ASR → LFR → LRFR
 - Prestressed Girder Shear
 - Concrete Box Culverts
 - Steel Limit States
 - Design vs. In-Service Analysis
 - Mistakes



35

Wis-SPV Load Rating Targets

- Wisconsin Bridge Manual Section 45.12
 - Target MVW > 190 kips w/ Single-Lane Loading
 - Plus FWS for new designs
 - Report ratings w/o FWS on Plans and Load Rating Summary Form
 - Consider Interior Girders or Slab Strips only
 - For rehab or in-service bridge ratings, contact BOS if MVW < 190 kips
 - Below 170 kips can restrict annual permits

36

Low Load Ratings on Good Bridges

- **Impacts**
 - Legal Weight Limit Restrictions
 - OSOW Freight Restrictions
 - Reduced Service Life
 - Inspection Frequency (Inv RF < 1.0)
- **Design Phase**
 - Consider refined analysis, alternate methods, or strengthening
 - Reach out to BOS Load Rating Unit to discuss options and scope

37

Posting Refinement Strategies & Justifications

Unknown Construction Details	Documented Engineering Judgment to Supplement Calculations	Limit State Options	Single-Lane Loading
Lane Striping and Curbs or Sidewalks	Live Load Factor Modification (Emergency Vehicles)	Dynamic Load Allowance Modification	Refined Analysis


38



Strengthening

- **Also consider cost-effective and practical strengthening methods**
 - **Overlays**
 - NSM stainless steel or FRP rebar can increase negative moment capacity in concrete slabs
 - **Redecks**
 - PS Girders – additional deck rebar (negative moment), FRP (shear)
 - Steel Girders – add shear studs (deck interaction), cover plates or flange plates
 - **Localized Repairs to Address Deterioration**
 - Steel girder repairs, timber cap replacements, column/pier jacketing
 - FRP on concrete pier caps for shear or flexure

39

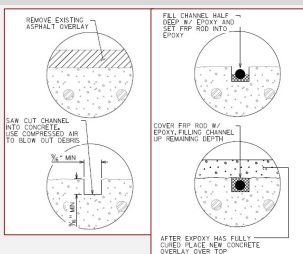
Steel Girder Retrofits









40

Concrete Slab – Top Surface Mounted Bars



REMOVE EXISTING ASPHALT OVERLAY
 SAW CUT CHANNEL INTO CONCRETE AND BLOW OUT DEBRIS
 FILL CHANNEL HALF DEEP W/ EPOXY AND SET #36 BAR INTO EPOXY
 COVER #36 BAR W/ EPOXY, FILLING CHANNEL UP REMAINING DEPTH
 AFTER EPOXY HAS FULLY CURED, PLACE NEW CONCRETE OVERLAY OVER TOP



41

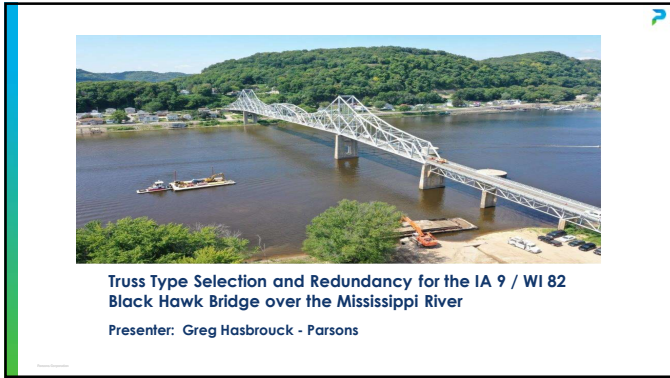
Substructure Strengthening



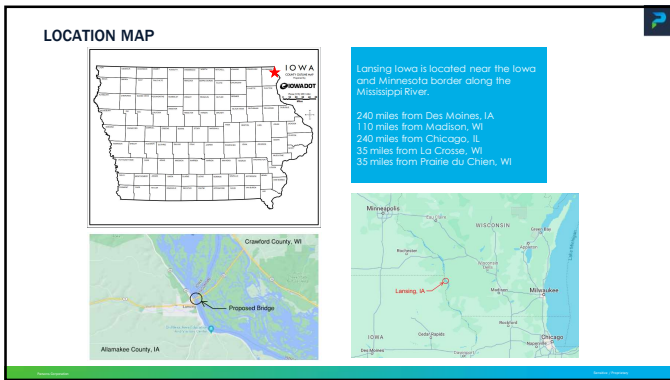




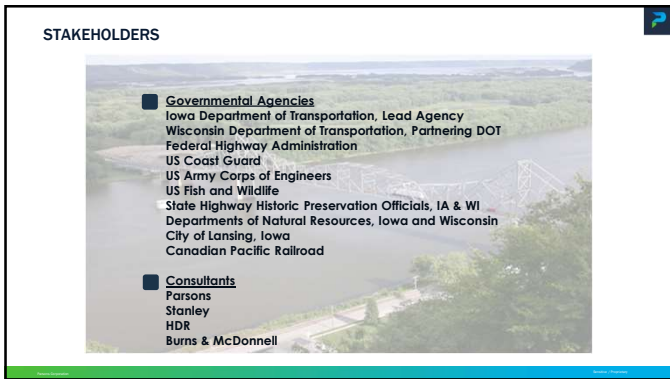

42



1



2




3

BLACK HAWK BRIDGE, 1931

The IA 9 Black Hawk Bridge was built in 1931 as a 3-span cantilevered steel truss, with drop-in span.

- Navigational channel span is 650 feet
- 67.5 feet above normal water elevation
- Total length of 1,653 feet
- 21-foot-wide travel way and has 18.5 feet of clearance.

The bridge is historic, and the community has adopted its unique character.



4

EXISTING BRIDGE, DOLPHINS, RAILROAD

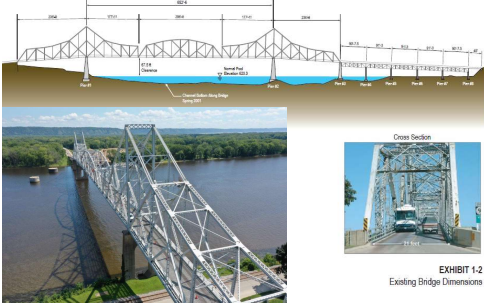



EXHIBIT 1-2
Existing Bridge Dimensions

5

GENERAL OVERVIEW



6

CROSSING LOCATIONS STUDIED

BUILD ALTERNATIVE CROSSING LOCATIONS

The image at the right depicts the Build Alternative locations currently being analyzed. These are the same locations presented at the first public meeting held for this study in August 2017. Preliminary layouts of these 4 alternatives and features near them are shown on the large maps in the display area.

Environmental Assessment

7

SELECTED NEW ALIGNMENT AND SITE FEATURES

Proposed New Bridge in Blue Adjacent to existing

8

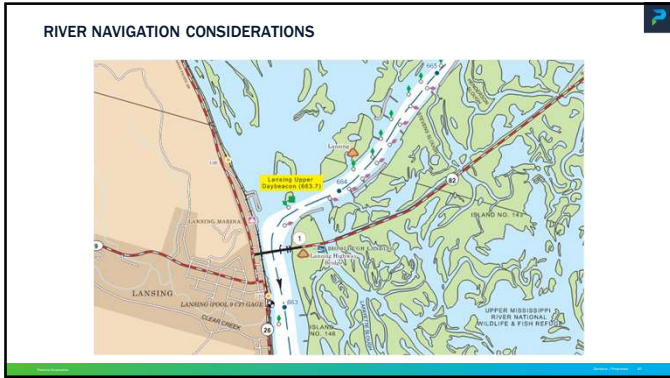
RIVER NAVIGATION CONSIDERATIONS

Sharpest Turn on Mississippi River

Simulation of a barge turning the tight corner of the river and through the bridge piers which are 650 feet apart.

Need to determine required length of new span

9



10



11

RIVER NAVIGATION STUDY
RIVER NAVIGATION EXERCISE – SEPTEMBER 25-27, 2017

The Iowa DOT and US Coast Guard worked with the Seamen's Church Institute in Paducah, Kentucky, to develop simulation models of the 4 crossing locations under consideration. Using the Institute's simulators, Mississippi River barge pilots were invited to "drive" through each crossing under various river conditions to help the study team evaluate issues associated with each crossing, including pier placement.

Example view from a simulation run as the barge approaches one of the proposed bridge crossing locations.

Example of a simulation run as each barge pilot is tracked by the simulator as they pilot their barge downriver and through the existing bridge location.

Below - pilots discuss approaches to navigating a new crossing location.

Environmental Assessment

12

30% DESIGN / DESIGN CONCURRENCE


- Develop Design Criteria and Redundancy Strategies
- Optimize Truss Layout
- Explore Constructability Options
- Develop Plans to 30% Level

- Type, Size & Location Concept – Simple Span & Two Span Continuous Truss with Counterweight and Faux Peak
- Unbalanced Span Arrangement – 213' / 760' / 383'
- Typical balanced truss side span at ~0.6 of main span
- Can we make continuous without permanent uplift?
- Can we optimize layout for steel weight and redundancy?
- How can we efficiently erect the truss?

19

WICHERT TRUSS OPTION

- Evaluated a Wichert Truss
 - Old continuous truss form creates hinge over pier
 - Solves concerns with pier settlement and uplift
 - Uses quadrilateral section at intermediate piers
- Addresses unique unequal span challenge for this project
 - However, stability during construction was a disadvantage
 - Would affect aesthetic from existing bridge
 - Contractors not familiar with it

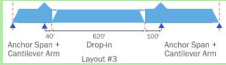


WICHERT TRUSS

20

30% SPAN CONTINUITY EVALUATION

- Investigated various continuity scenarios
 - TS&L Option – Simple span & Two span continuous
 - Explored unsymmetric drop-in span option but not favorable due to hinges and joints in main span and not redundant



- Explored various 3 span continuity options with various sequences of construction and load application
- Provide options for construction
 - 3 span continuous allows construction to be built in cantilever out over the main span
 - TS&L design assumed main span float-in

21

30% SPAN CONTINUITY EVALUATION

- Option 0 (TS&L)**
 - Erect entire steel superstructure (only Pier 2 cont.)
 - Pour CIP deck concrete for all 3 spans
 - Add SDL and LL
- Option 1**
 - Erect entire steel superstructure (cont. Pier 1 and 2)
 - Release upper chords at Pier 1 and Pier 2
 - Pour CIP deck concrete for all 3 spans
 - Reconnect upper chords at Pier 1 and Pier 2
 - Add SDL and LL
- Option 2**
 - Erect entire steel superstructure (cont. Pier 1 and 2)
 - Release upper chords at Pier 1 and Pier 2
 - Pour CIP deck concrete for Span 1 and Span 3
 - Reconnect upper chords at Pier 1 and Pier 2
 - Pour CIP deck concrete for Span 2
 - Add SDL and LL
- Option 3**
 - Erect entire steel superstructure (cont. Pier 1 and 2)
 - Release upper chords at Pier 1 and Pier 2
 - Pour deck concrete for Span 1, 3 and West 8 Panels of Span 2
 - Reconnect upper chords at Pier 1 and Pier 2
 - Pour CIP deck concrete for East 6 Panels of Span 2
 - Add SDL and LL
- Option 4**
 - Erect entire steel superstructure (cont. Pier 1 and 2)
 - Release upper chords at Pier 1 and Pier 2
 - Pour CIP deck concrete for Span 1 and Span 3
 - Reconnect upper chords at Pier 2
 - Pour CIP deck concrete for Span 2
 - Reconnect upper chords at Pier 1
 - Add SDL and LL
- Option 5**
 - Erect entire steel superstructure (cont. Pier 1 and 2)
 - Release upper chords at Pier 1
 - Pour CIP deck concrete for all 3 spans
 - Reconnect upper chords at Pier 1
 - Add SDL and LL

22

SUPPORT REACTIONS

Minimum Support Reactions (kips)

Support	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
West Abutment	445	110	-185	35	108	75
Pier 1	2370	3040	3120	2975	2850	2325
Pier 2	4350	3510	3390	3430	3570	4220
Pier 3	-215	640	480	555	465	-175

Notes:
1. Reactions are per truss plane due to envelope of Strength I and Strength IV load combinations under vertical gravity loads (DC, DW, LL+IM) only.

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TRUSS WEIGHT

Weight of Truss Members (lbs)

Span	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
1	556,000	632,000	575,000	564,000	564,000	551,000
2	3,572,000	4,572,000	3,865,000	4,192,000	4,163,000	3,286,000
3	1,052,000	954,000	862,000	862,000	873,000	980,000
TOTAL	5,180,000	6,158,000	5,300,000	5,618,000	5,600,000	4,817,000

Note: Weights are for two truss planes and include the weight of truss members only.

Truss Weight per Unit Area (psf)

Span	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
1	52	99	54	53	53	52
2	88	113	96	104	103	81
3	55	50	45	45	46	51

Note: Truss weight shown is only for primary truss members. Weight of longitudinal stringers, floor beams, lateral bracing, and other misc. steel is not included.

Steel Weight Estimate From Historic Data (psf)

Span	Simple	Cont.
1	65	55
2	170*	125
3	80	70

Note: *Estimated from US 60 over Cumberland River Truss Bridge. Includes all structural steel for superstructure.

24

REDUNDANCY STRATEGY

Number of H-Section Tension Members

Member	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
Upper Chord	11	6	9	9	8	15
Vertical	18	16	17	16	17	19
Diagonal	12	15	14	15	15	12
TOTAL	41	37	40	40	40	46

Number of H-Section Tension Members with Axial Force > 2500 kips

Member	Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
Upper Chord	4	0	0	0	0	4
Vertical	0	0	0	0	0	0
Diagonal	3	4	4	4	3	3
TOTAL	7	4	4	4	3	7

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SUMMARY OF SPAN CONTINUITY EVALUATION

Option	Total Truss Weight (lbs)	Weight Ratio Normalized to Option 0	No. of H-Section Members with Tension > 2500 kips	Release/Reconnect operation at Pier 1	Release/Reconnect operation at Pier 2	Counterweight at Abutment	Counterweight at Pier 3
0	5,180,000	1.00	7	No	No	No	Yes
1	6,158,000	1.19	4	Yes	Yes	No	No
2	5,300,000	1.02	4	Yes	Yes	Yes	No
3	5,618,000	1.08	4	Yes	Yes	No	No
4	5,600,000	1.08	3	Yes	Yes	No	No
5	4,817,000	0.93	7	Yes	No	No	Yes

26

30% TRUSS GEOMETRY, PANEL LAYOUT & MEMBER TYPE

- Constructability, Efficiency, Cost & Aesthetics
- Height was kept similar to TS&L Design
- Optimized panel length from 42' to 55' to Truss Panel Layout and Length
 - Minimize number of truss nodes while optimizing
 - Crane sizes
 - Member weights and lengths
- Explored Nodal Connections vs. Gusset Plates

27

30% FLOOR SYSTEM

- Floor System Configuration
- How floor beams and stringers interact
- Stringers float over floor beams or stringers integral with floor beams?
- Deck integral with stringers or stringers & floor beams

Stringers on top of FBs

Stringers integral with FBs

28

30% FLOOR SYSTEM

HALF SECTION AT FLOOR BEAM - FBI THRU FB#1

HALF SECTION AT STRINGER DIAPHRAGM

29

FHWA POLICY AND REDUNDANCY

- Fracture Critical Members (FCMs)
 - Fracture of member likely results in collapse of the bridge
 - Require higher steel toughness and fabrication standards
 - Require more frequent inspection (Previously - hands-on every 2 years)
 - 2 girder / truss systems are "Fracture Critical"
 - 3 or more girder systems are redundant
 - Now - Nonredundant Steel Tension Members (NSTMs)
- Internally Redundant Member (IRMs)
 - Bolted built-up members
 - One plate fractures, load still carried by other plates
- System Redundant Member (SRMs)
 - Gains redundancy by redistribution of load laterally through the system
 - Show by complex analysis

30

30% REDUNDANCY STRATEGIES

- Internal Member Redundancy – built-up bolted member
- Post-Tensioning Redundancy – external PT
- Post-Tensioned Concrete Member – heavy
- Load Redistribution by redistribution to the other Truss Plane
- Parallel Members for Tension Only Members
- Redundancy for Stress Reversal Members

31

TS&L VS FINAL DESIGN

TS&L

Final

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DESIGN STANDARDS

- AASHTO LRFD 9th Edition
- AASHTO IRM Guide Spec
- AASHTO SRM Guide Spec
- AASHTO / AWS D1.5 – Bridge Welding Code
- Iowa DOT Bridge Design Manual

Redundancy I Limit State – At Time of Fracture for SRM
 $(1 + DA_0) * [1.05DC + 1.05DW + 0.85(LL+IM)]$ where IM = 0.00,

Redundancy II Limit State – After Fracture for SRM & IRM
 $1.05DC + 1.05DW + 1.30(LL+IM)$ where IM = 0.15,

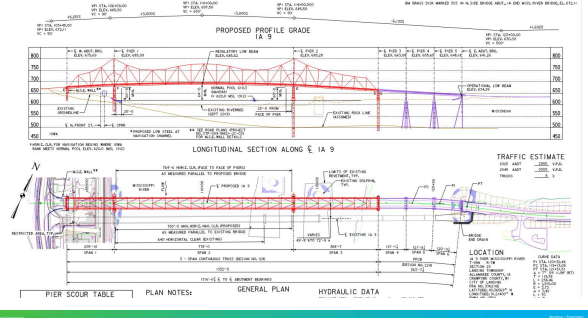
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STEEL TRUSS DESIGN SUMMARY

- 206' - 778' - 369' three-span truss
- 40 ft wide roadway
- 52 ft CL to CL truss chords
- Erection Sequence to eliminate uplift on back spans
 - Simple for DL, continuous for LL
 - Relieve top chord continuity over piers for back span deck pours
 - Reconnected after pours
- Truss members
 - Lower chord box section
 - Upper chord and diagonal H-sections
 - Vertical H and parallel T sections
 - 51 ft to 56 ft truss panel / floor beam spacing
 - Floor beams and stringers integral with deck

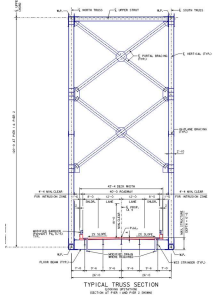
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GENERAL PLAN & ELEVATION

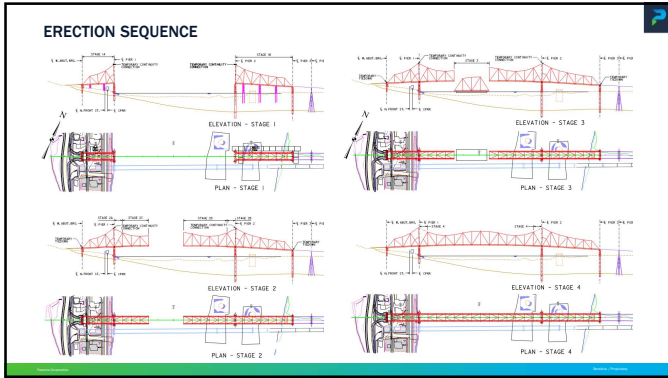


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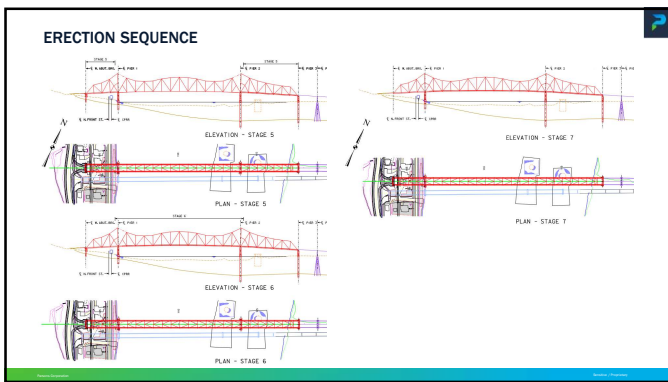
TRUSS SECTION WITH PORTAL BRACING



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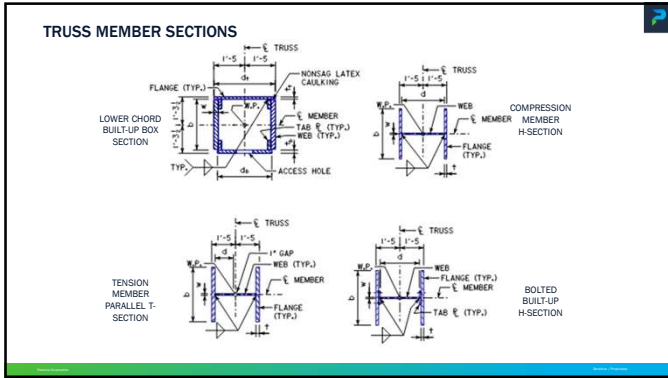


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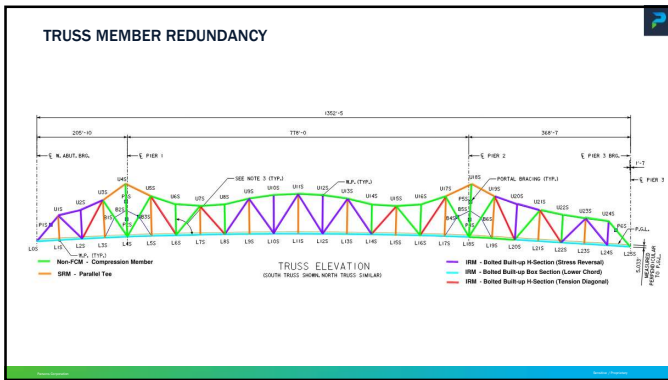
STEEL TRUSS DESIGN SUMMARY

- Portal bracing at ends, piers and main span first diagonal
 - Portal, Upper and In-plane Bracing – I-sections
 - Lower lateral bracing – WT-sections
- Redundancy strategies include
 - Built-up internally redundant tension members (IRMs)
 - Parallel T system redundant tension members (SRMs)
 - Gusset plates – some with redundancy plates (IRMs)
 - Floor beams (SRMs)
- Steel Material
 - All IRMs either HPS70WF or HPS50WF steel
 - All Gussets HPS70W (most HPS70WF)
 - SRMs Grade 50F
 - Other steel Grade 50 or 50(T)

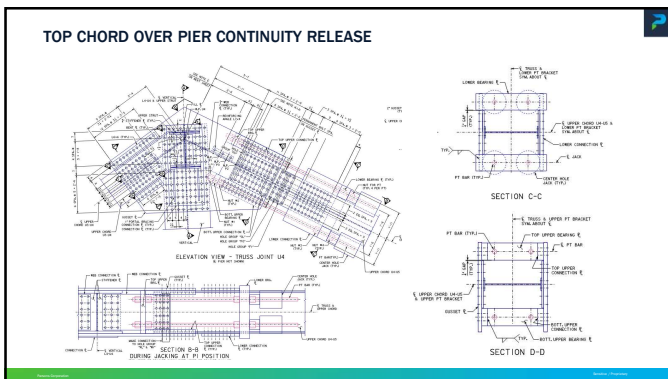
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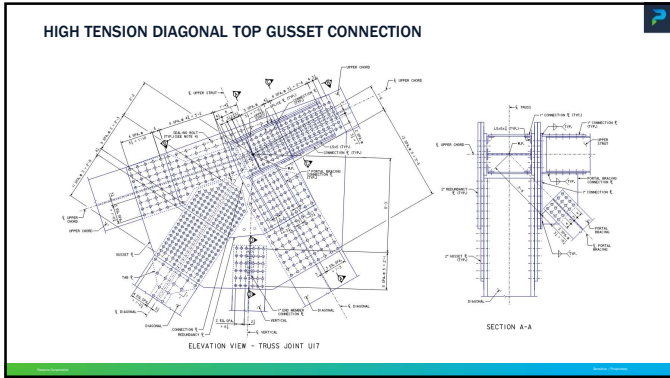
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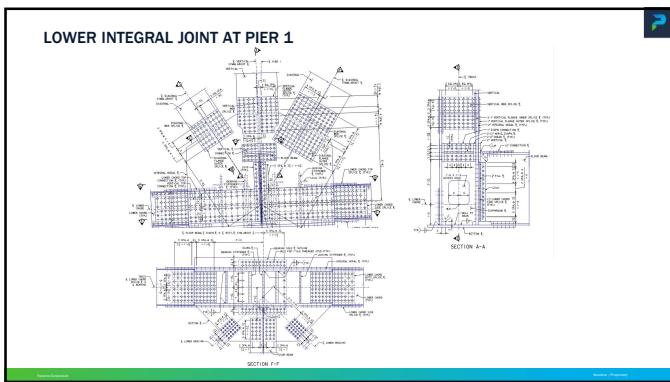
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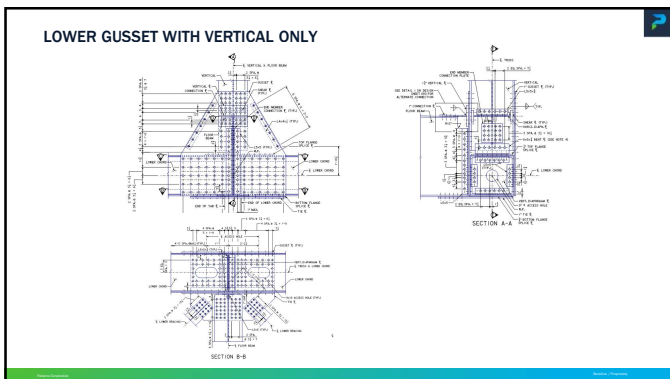
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STEEL TRUSS ADDITIONAL ITEMS

- Truss fabrication for geometric angles
- Integral node connections at Pier Bearings
- 1" and 7/8" diameter A325 bolts
 - Built-up members use 7/8" along length in shop
 - Main field connections use 1" (except lower lateral)
- Option to use F3148 Torque & Angle bolts in lieu of A325
 - Connections do not take advantage of increased strength
 - No mixing within connections
- Corrosion Protection
 - Truss steel – Duplex Metallizing throughout
 - Stainless steel rebar in deck and barriers

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RENDERINGS

BRIDGE HEIGHT
New Bridge: 100' Old Bridge: 100'

BRIDGE DECK WIDTH
New Bridge: 60' Old Bridge: 52'

BRIDGE LAIR WIDTH
New Bridge: 17' Old Bridge: 17'

FOUNDATION DEPTH
New Bridge: 100' Old Bridge: 100'

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QUESTIONS?

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Wisconsin Highway Research Program
James Luebke
 WisDOT Policy and Standards Engineer
 WisDOT Structural Engineers Symposium
 Madison, WI
 5-26-2026



1

Overview

- What is the WHRP
- Recently Completed Projects
- Active Projects





2

Wisconsin Highway Research Program (WHRP) Overview


- Established in 1998
- Collaboration with the University of Wisconsin - Madison
- Four research areas
 - Flexible Pavements
 - Rigid Pavements
 - Geotechnics
 - Structures
- GOAL: Practical research → implementable results



3

WHRP


- Better Ways to Design, Build and Reconstruct
- Selected and overseen by WisDOT, Academia, Industry, Consulting Engineers, and the FHWA.
- Structures Area – 1 to 2 projects/Year



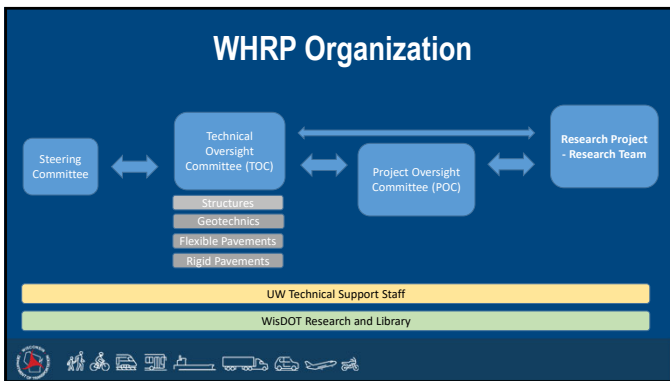
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WHRP Funding

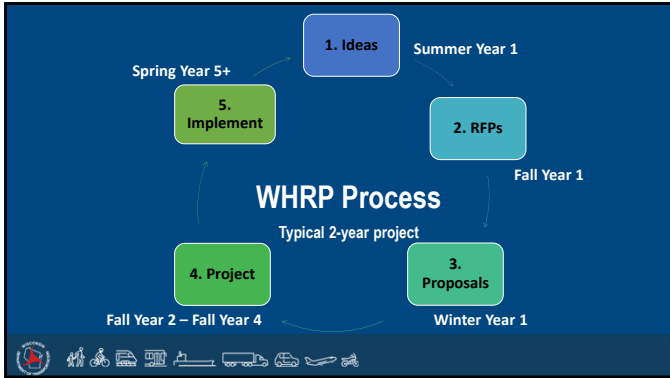
- WHRP project funding is approximately \$1 million annually
- Projects are funded by:
 - 80% FHWA federal funds (SPR, Part B Research), and
 - 20% WisDOT state funds



5



6



7



8



9

Recently Completed Projects

- Bridge Deck Thermography Verification and Policy
- State of Practice for Specifying and Repairing MSE Walls
- Investigation of MSE Wall Corrosion in Wisconsin (Geotech)



10

Investigation of MSE Wall Corrosion in WI



PI: Geocomp, Inc
 PM: Steven Doocy
 Completion: 10/2025

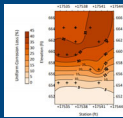
Figure: FHWA-HIF-24-002



11

Investigation of MSE Wall Corrosion in WI

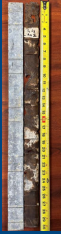
- Findings/Recommendations:
 - Upper reinforcement rows more exposed to excessive corrosion
 - Pavement condition index (PCI) may be used to evaluate the significance of pavement cracks.



12

Investigation of MSE Wall Corrosion in WI

- Findings/Recommendations:
 - Pavement cracks and joints - Critical impact of corrosion
 - Moisture and salt intrusion was found as main factors causing excessive corrosion - Use impervious membrane and drainage systems -
 - Regularly maintain pavement surfaces and drainage structures - to prevent moisture and salt intrusion.



13

State of Practice for Specifying and Repairing MSE Walls

- Objectives:
 - Identify best practices for MSE wall usage
 - Recommendations to maximize MSE wall service life
 - Prepare recommendations for specific retrofit solutions

PI: Applied Research Associates, Inc.
 PM: Ruth Coisman
 Completion: 2/2026

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State of Practice for Specifying and Repairing MSE Walls

- Outcomes:
 - Developed a vulnerability and risk-based framework for inspection and repair
 - Detailed Commentary on WisDOT practices
 - Selected defects, probable causes, and repair strategies for MSE structures.


Number of Defects per 1000 sq ft	Expected or Observed Condition			
	1-4 (Green)	5-9 (Yellow)	10-19 (Orange)	20+ (Red)
0-10	1.0	0.5	0.5	0.5
11-20	1.0	0.5	0.5	0.5
21-30	1.0	0.5	0.5	0.5
31-40	1.0	0.5	0.5	0.5

Based on WisDOT Condition State

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Active Projects

- Vertical and Overhead Concrete Patches
- Investigation of Removing Existing Abutment Exp. Joints
- Investigate Wisconsin Bridge Scour in Mobile (Alluvial) Sand-Bed Rivers
- *Evaluation of Exposed Cast-in-Place Concrete Piles in Corrosive Environments in the State of Wisconsin (Pre-Contract)*




16

Vertical and Overhead Concrete Patches

- Problem Statement:
 - Project-by-project acceptance
 - Rapid Setting APL - Limited to horizontal concrete surface repairs on concrete pavements and bridge decks
 - Rely on the manufacturer's repair recommendations and field engineers' discretion

PI: WJE
PM: Andrew Smith
Completion: 4Q/2025 5/2026



17

Vertical and Overhead Concrete Patches

- Objectives:
 - Investigate and provide material selection guidance and repair strategies for concrete surface repairs
 - Investigate the performance of minor to intermediate patch repairs (< 2" deep and located above traffic)



Draft Report: Hand-applied patch in overhead orientation



Draft Report: Form-and-pour in overhead orientation

PI: WJE
PM: Andrew Smith
Completion: 4Q/2025 5/2026




18

Investigation of Removing Existing Abutment Expansion Joints

- Objectives:
 - Examine WisDOT's practice of removing existing expansion joints at substructures.
 - Define practical limits of substructure conversions.
 - Prepare recommendations for converting substructures.

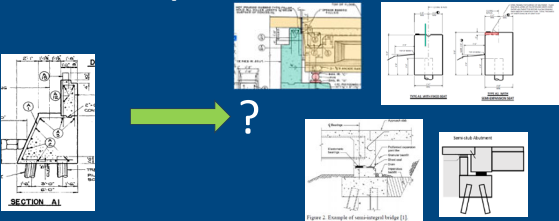


PI: UW-Milwaukee
PM: Laura Shadewald
Completion: 10/2026




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Investigation of Removing Existing Abutment Expansion Joints




PI: UW-Milwaukee
PM: Laura Shadewald
Completion: 10/2026




20

Evaluation of Exposed CIP Piles in Corrosive Environments

- Objectives:
 - Evaluate the structural integrity, and the long-term performance of CIP concrete pile bent piers in Wisconsin's corrosive environments.



PI: TBA
PM: James Luebke
Completion: 10/2028




21

Evaluation of Exposed CIP Piles in Corrosive Environments

- Objectives:
 - Investigate corrosion at the waterline
 - Evaluate longevity at critical sections
 - Develop guidelines for open pile bents


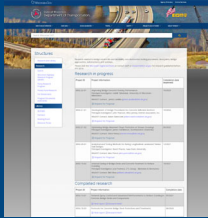
PI: TBA
PM: James Luebke
Completion: 10/2028



22

WHRP Reports:

- <https://wisconsindot.gov/Pages/about-wisdot/research/structures.aspx>



23

Thank You



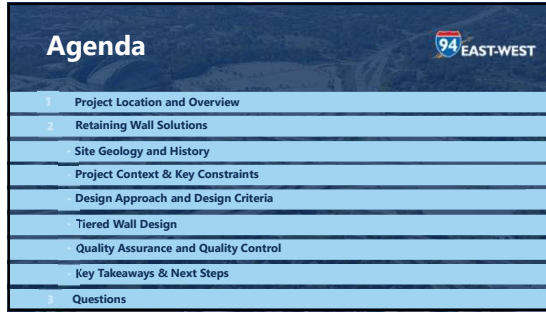
James Luebke, PE
James.luebke@dot.wi.gov
(608) 266-5098



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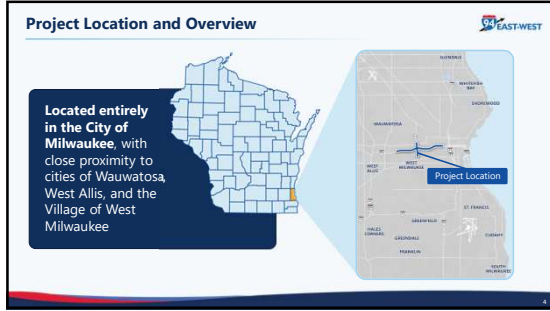
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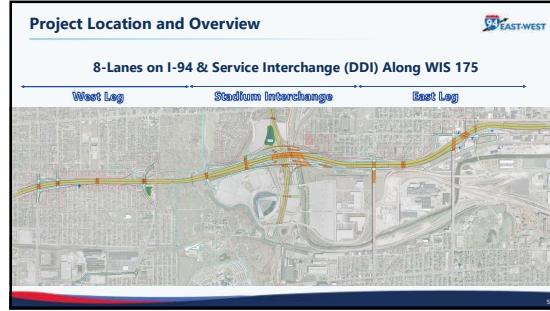
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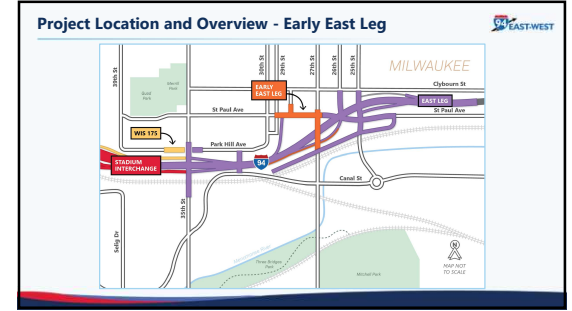
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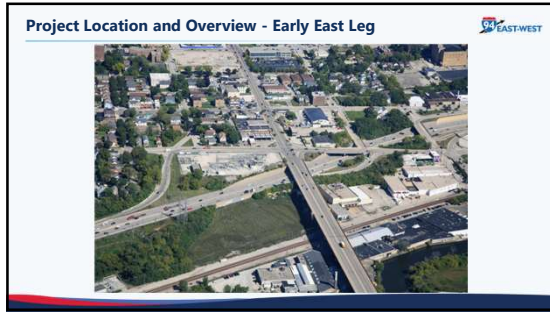
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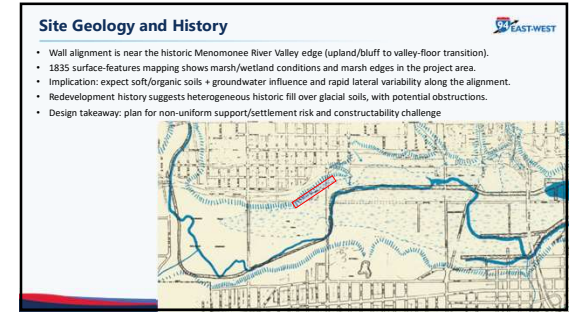
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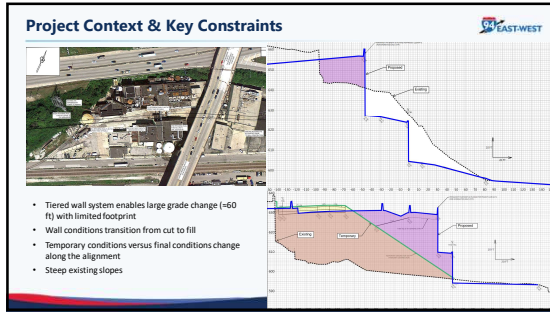
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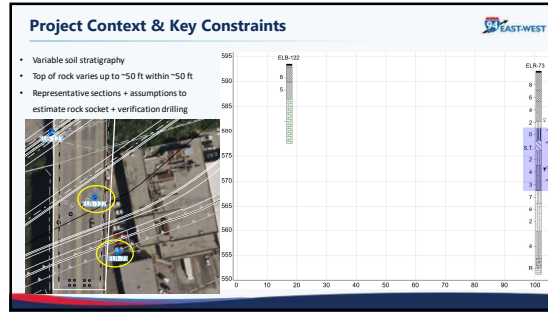
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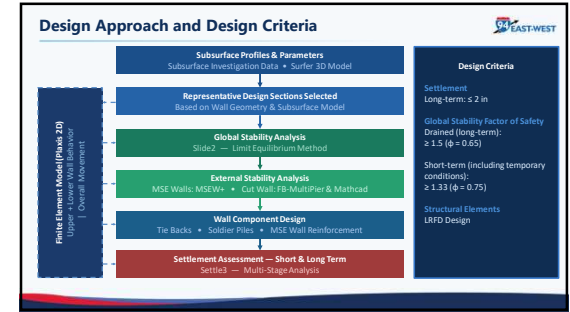
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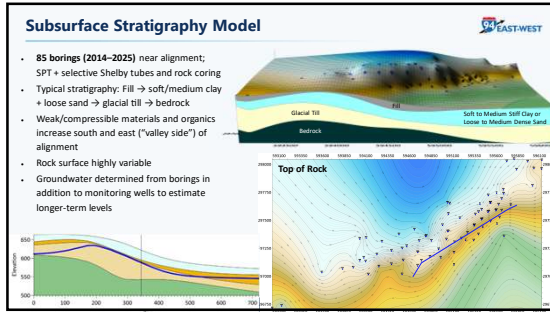
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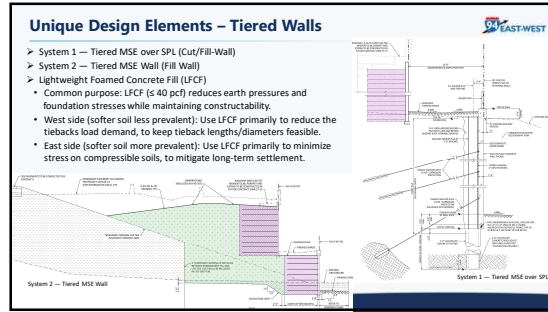
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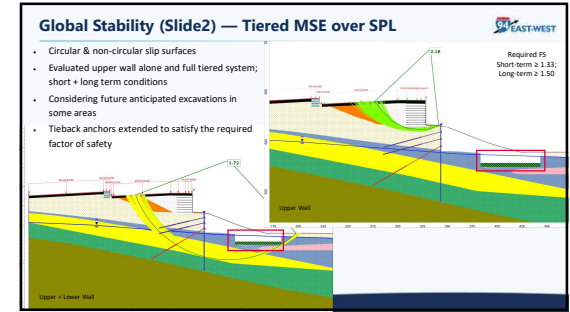
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15

Global Stability (Slide2) — Two-tier MSE

- Circular & non-circular slip surfaces
- Evaluated upper wall alone and full tiered system; short + long term conditions
- Evaluate Temporary and Final Conditions with different alternatives
- LFCF extended to meet the factor of safety
- Interface sensitivity check

The slide displays two cross-sectional diagrams of a two-tier MSE wall. The left diagram, labeled 'Temporary Conditions Option 1', shows a circular slip surface passing through the upper tier. The right diagram, labeled 'Temporary Conditions Option 2', shows a non-circular slip surface. A 'Final Conditions' diagram at the top right shows a similar slip surface. A color-coded stability chart is also visible, showing safety factors for various conditions.

16

Anchored SPL Wall — Structural & Geotechnical Design

- Analysis methods: FB-MultiPier (p-y) + PLAXIS 2D (staged FEM), p-y for efficiency; FEM for staging & interaction.
- Soldier piles: W24x104, 7.5 ft spacing, 3 ft diameter drilled shafts with rock socket
- Anchors: up to 3 levels; lower level embedded to rock to satisfy the global stability demands
- Key results are the deflection of the walls and load demands were determined to size the different structural elements.
 - Max deflection: ~0.7–2.2 in
 - Max moment: ~680 kip-ft
 - Max anchor load: ~260 kip

The slide features a schematic of a typical SPL section with three soldier piles (W24x104) spaced at 7.5 ft on center, and a 3 ft diameter shaft. To the right, a 'Plaxis 2D' data table shows soil parameters and design results. Below the schematic, a 'Final Conditions' diagram shows the wall's deflection profile.

17

Settlement — Staged Consolidation (Settle3) + LFCF

- Time-dependent consolidation with staged excavation/fill modeled
- LFCF used within reinforced zone and behind the wall to reduce loading
- Predicted post-pavement settlement generally ≤ 2 in with construction staging equivalent to ~1 year 'holding period' before final paving
- Facing performance: total settlement < 4 in, differential < 1/200 (supports precast panel use)
- Monitoring required to confirm performance due to soft/organic layers in some zones

The slide shows two cross-sectional diagrams of a wall. The top diagram, 'Staging Conditions', shows the wall during construction with staged excavation and fill. The bottom diagram, 'Final Conditions', shows the wall after completion. A color-coded settlement chart is also present, indicating predicted settlement values across the site.

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Settlement-Induced Anchor Distress Behind SPL Wall

- Drilled shafts are socketed into rock so no movement anticipated
- Ground settlement may result in shearing the ground anchor
- Provide compressible foam around the third row of anchors to accommodate relative displacement

19

Quality Assurance and Quality Control

Preconstruction / Verification

- Estimating top of rock at each drilled shaft location during design.
- Verify top of rock at each drilled shaft location to confirm socket/bond zone assumptions.

Construction QA/QC

- Anchor testing: proof test all anchors; in addition to WisDOT required performance tests (±5% of the anchors).

Instrumentation / Long-Term Performance

- Monitor wall movements during excavation and staging; track anchor loads.
- Continue long-term monitoring to confirm performance and settlement trends.
- Defined warning and maximum threshold for the instrumentation.

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Quality Assurance and Quality Control - Instrumentation

- **Inclinometers (7):** Lateral displacement profile vs. depth (ground & wall).
- **Vibrating Wire Piezometers (4):** Pore water pressure (soft soils)
- **3-Axis Tiltmeters (14):** Wall/facing rotation & direction (early warning).
- **VW Load Cells (Tiebacks) (6):** Track anchor load retention / load change.
- **Earth Pressure Cells (12):** Measure lateral pressures behind wall during staging.
- **Surface Settlement Markers (18):** Vertical settlement (pavement/LFC/soil).
- **Structure Settlement Markers (24):** Protect adjacent structures/utilities.
- **Strain Gauges (6):** Confirm structural demand/response.

21

Key Takeaways & Next Steps

- A **tiered retaining wall system** enabled a +60 ft grade change within a constrained urban footprint.
- Lightweight Foamed Concrete Fill** (< ~40 pcf) was the critical lever:
 - West: reduced SPL tieback demand (constructability)
 - East: reduced stresses on compressible soils (settlement control)
- A unified **ground model (85 borings)** and **representative sections** ensured consistent inputs across stability, deformation, and settlement tools.
- Staged analyses** (temporary vs final) governed design decisions, including a **minimum tier offset ~50 ft** to meet performance targets. Settlement target: **≤ 2 in post-pavement** supported via staged consolidation modeling and a waiting period strategy.

Performance Verification


- Risk managed through **3D ground modeling, anchor testing, and instrumentation**, with monitoring planned for **≥ 2 years** post-construction.

Next Step

- Collecting data from different instrumentation during and after construction, and compare the analysis versus field data.

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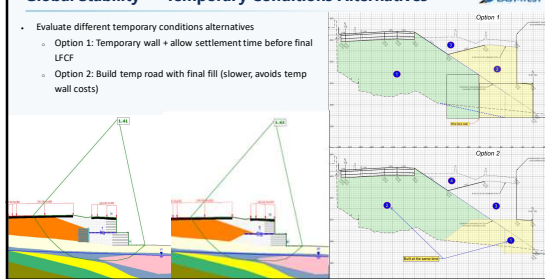
Questions/Discussion



23

Global Stability — Temporary Conditions Alternatives

- Evaluate different temporary conditions alternatives
 - Option 1: Temporary wall + allow settlement time before final LFCF
 - Option 2: Build temp road with final fill (slower, avoids temp wall costs)



24



2026 Geotechnical Updates


David Staab, PE
Geotechnical Engineering Unit Supervisor

Structural Engineers Symposium
Madison College
May 26, 2026

1

Geotechnical Engineering Unit Staff Updates


<p><u>2024</u></p> <p>Dave Staab, Supervisor Paulo Florio, Geotech. Eng. Crystal Goffard, Geotech. Eng. Tri Tran, Geotech. Eng. Dan Reid, Geologist (Retired Feb. 2025) Mark Kray, Lab Technician</p>	<p>→</p>	<p><u>2026</u></p> <p>Dave Staab, Supervisor Paulo Florio, Geotech. Eng. Crystal Goffard, Geotech. Eng. Tri Tran, Geotech. Eng. Jeff Bruesewitz, Geologist Mark Kray, Lab Technician</p>
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2

Geotechnical Data Management


- gINT – industry standard for preparing soil boring logs for 40+ years
- Bentley is “sun-setting” gINT – ~~2026~~ 2028(?)
- About 5 - 6 programs exist to fill this purpose
- WisDOT evaluated 4 programs to replace gINT (2022 - 2024)




3


Geotechnical Data Management

- BoreDM selected
 - Customer service
 - Cost
 - Features
- More user-friendly and powerful than gINT
- Consume and convert gINT files to BoreDM
- Civil 3D compatible
- DiGGS compatible

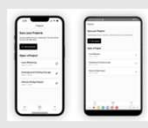





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Field App




Boring Log App



Geotech Lab App



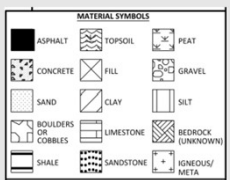



Graphics: BoreDM; Photo: Gilson Co.

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Boring Log Updates

- Library Updates
 - Soil classification
 - Symbology





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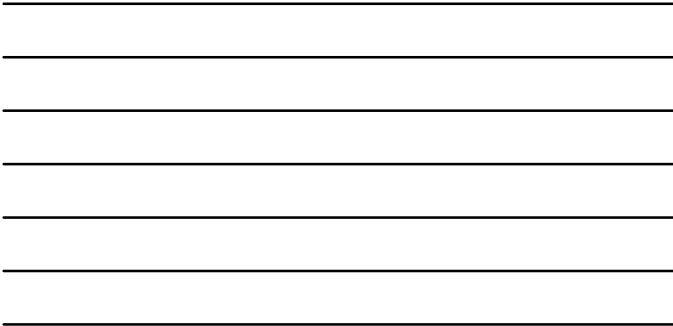
Boring Log Updates

- Boring Log Template Updates
 - Heading Information

WI Dept. of Transportation 2500 Koshong Road Madison, WI 53704		PROJECT NUMBER: 8148-01-73 BORING ID: B-2A
DRILLER: WISDOT DRILL DATE: 04/13/2011 DRILL TIME: 08:00 AM DRILLER: D. Smith DRILLER PHONE: 608.261.1234	BORING NAME: USA 13 BORING LOCATION: 1000 S. Koshong Rd. (1000 S. Koshong Rd.) BORING TYPE: Auto BORING EFFICIENCY: 80%	DATE: 04/13/2011 TIME: 08:00 AM COUNTY: Dane TOWNSHIP: Koshong SECTION: 36 RANGE: 13N MERIDIAN: 43° 03' 00" W ELEVATION: 608.7

WATER LEVEL & CAVE-IN OBSERVATION DATA			
WATER DEPTH AT TIME OF DRILLING:	2.5'	CAVE - IN DEPTH AT TIME OF DRILLING:	NMR
WATER DEPTH AT END OF DRILLING:	NMR	CAVE - IN DEPTH AT END OF DRILLING:	NMR
WATER ENCOUNTERED AFTER DRILLING:	N/A	CAVE - IN DEPTH AFTER DRILLING:	N/A
TIME AFTER DRILLING (HOURS):	24 hrs	DEPTH:	NMR

7

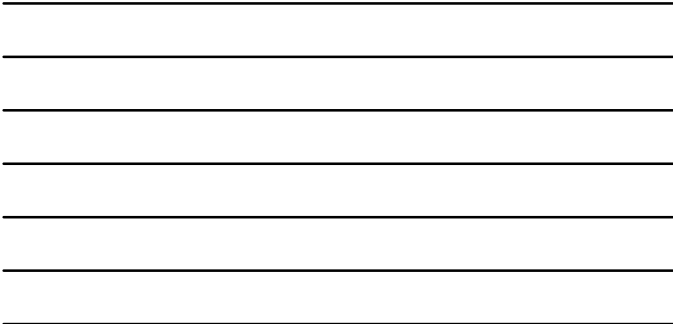


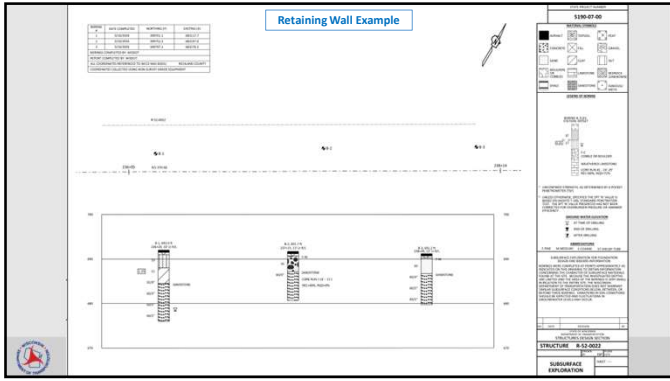
8



Box Culvert Example

9





10

Timeline



- WisDOT Implementation
 - Boring Log App – April 2026
 - Field App – Expected 2026
 - Lab App – Expected 2026
- Soft rollout
 - Feedback from external partners already using BoreDM
 - Updates (As needed)
 - Later 2026?
- Publish (through BoreDM)
 - Library
 - Template

11

How can geotechnical data from different boring log programs be handled?

12

Geotechnical Data Management





- Data transfer protocol for geotechnical data
- BoreDM is DiGGS compatible
- Other programs are working towards DiGGS compatibility
- Ohio DOT has been using DiGGS for 10+ years

Source: ASCE Geo-Institute

13

Geotechnical Data Management



Bachus, et al., Deep Foundations, May/June 2020

14

Geotechnical Data Management

**Standard Practice for
Digital Interchange of
Geotechnical Data**

AASHTO Designation: PP 102-20 (2022)¹

First Published: 2020 Reviewed but Not Updated: 2022

Technical Subcommittee: 1b, Geotechnical Exploration, Instrumentation, Stabilization, and Field Testing

4.2. Complete records of all data identified to be recorded and reported by geotechnical standard test procedures, or as specified by the Agency and conducted by the Agency or on the Agency's behalf by contracted geotechnical service providers, shall be transferred to the Agency and by the Agency in a format consistent with the DiGGS schema.

15

What's required for geotechnical data at this time?

- Continue using the WisDOT gINT template and library
- Discuss with your geotechnical partners
- Stay tuned for more updates



16

Other Items

- Geotechnical Addenda
 - E-submit updated geotechnical reports
- Document submission (if required by contract)
 - gINT logs – DOTDTSDDotGeotechnicalgINT@dot.wi.gov
 - SIRs and Lab Work - DOTDTSDDotGeotechnicalSirLab@dot.wi.gov



17


Questions?



David Staab, PE
david.staab@dot.wi.gov
 608-246-7952



18



Bridge Scour and Pile Analysis

Steve Neary, James Luebke, Andrew Smith

May 2026 WisDOT Structural Engineers Symposium
Madison, WI
5.26.2026

1

Overview

- Discussion topics
 - Scour components, total scour depth
 - Evaluating stability in total scoured condition






2

What is Scour?

- Definition
 - Erosion of streambed or bank material due to flowing water; often considered as being localized
- Types
 - Contraction
 - Local (pier, abutment)
 - Pressure

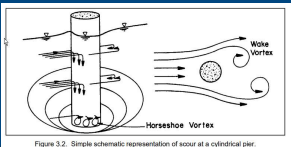


Figure 3.2. Simple schematic representation of scour at a cylindrical pier.

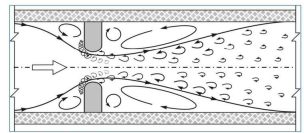


Figure 3.7. Flow structure including macro-turbulence generated by flow around abutments in a narrow main channel (NCHRP 2011b).

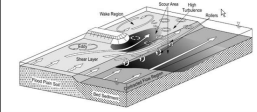




Figure 3.8. Flow structure including macro-turbulence generated by floodplain/main channel flow interaction, flow separation around abutment, and wake region on the floodplain of a compound channel (NCHRP 2011b).

3

Abutment Scour

- NCHRP 24-20 method
 - Amplified contraction scour
 - Pressure, cohesive – not applicable

Bridge Embankment Failure Zone Effective Pile Length

Streambed

AS (RCF) + LTD

For representation of NCHRP 24-20 terms ONLY

$y_s = y_{max} - y_o$

HEC-18 (2012) Eqn. 8.4

Figure 8.1 Scour amplification factor for split-through abutments and tee box conditions (see also Figure 8.2)

4

Other Scour Considerations

- Sediment
 - Live bed vs clear water
 - Cohesive
 - Layers
- Results
 - Are they reasonable?
 - Multidisciplinary scour team

ASPHALT

ASPHALT

GRADE

EXISTING GROUND

LINE AT PROPOSED

C/L OF PROFILE

40'-0" LG. C/P CONCRETE
30 3/4" x 0.365-INCH
PRE-BORER 30'-0"

40'-0" LG. C/P CONCRETE
10 3/4" x 0.365-INCH
PRE-BORER 30'-0"

E.O.B. -81

BUREAU OF STRUCTURES

5

Stream Migration

- Lateral migration
 - UWPs
 - 2013 vs 2023
 - Aerial photos
 - County GIS
 - WI Historic Aerial Imagery Finder
 - Google Earth

BUREAU OF STRUCTURES

6

Total Scour

- Scour elevation at each substructure
 - Abutment = LTD + Abutment scour
 - Pier = LTD + Contraction + Pier scour

7

Bridge Scour - Piles

- WisDOT Bridge Manual
 - 8.3.2.7 - All bridges shall be evaluated to determine the vulnerability to scour.
- AASHTO LRFD BDS
 - C2.6.4.4.4 – Change in Foundation Conditions due to Scour

“Scour is not a force effect per se, but the change in conditions of the substructure may significantly alter the consequences of force effects acting on the structure”
 - 10.7.1.5 – Pile design shall address the following issues as appropriate:
 - Minimum pile penetration necessary to satisfy the requirements caused by scour.
 - Pile foundation nominal structural resistance (with or without scour).
 - Long-term durability of the pile in service, i.e., corrosion and deterioration.

8

Bridge Scour - Resources

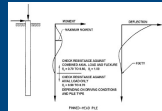
- WisDOT Bridge Manual
 - Chapter 8 – Hydraulics (Load/Condition)
 - Chapter 11 – Foundation Support (Geotech and Structural Resistance)
 - General - Simplified and Non-Simplified Pile Practices
 - Scour - Piling analyzed as unbraced columns
 - Scour - Compensate for the resistance capacity that is lost due to scour.
 - Chapter 12 and 13 – Abutments and Piers (Specific applications: Integral abutments, exposed pile bents)
- AASHTO LRFD BDS
 - 10th Edition scour updates
- Other References:
 - FHWA – HEC-18 - Evaluating Scour at Bridges
 - FHWA – GEC-12 - Design and Construction of Driven Pile Foundations
 - FHWA – GEC-10 – Drilled Shafts: Construction Procedures and Design Methods

9

Bridge Scour – Pile Design

- H-Piles**
 - Simplified Practices - Table 11.3-5
 - Axial Load Only - Simplified Practices
 - Fully Supported
 - No Lateral Loads
 - LRFD 6.9.4 - Steel Compression Member
 - $\phi = 0.50$ (compression of H-pile and severe H-pile damage) – LRFD 6.5.4.2
 - Non-Simplified Practices
 - Refer to LRFD 6.15 – Piles
 - Axial Compression (LRFD 6.9.4 Non-Composite)
 - Combined Axial load and Flexure (LRFD 6.9.2.2)
 - Flexural Resistance (LRFD 6.12)

Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

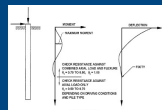


10

Bridge Scour – Pile Design

- CIP Piles**
 - Simplified Practices - Table 11.3-5
 - Axial Load Only - Simplified Practices
 - Fully Supported
 - No Lateral Loads
 - LRFD 5.6.4 - Concrete Compression Member
 - Neglecting steel shell after driving
 - $\phi = 0.75$ (compression concrete) – LRFD 5.5.4.2
 - Non-Simplified Practices
 - Refer to LRFD 6.15 – Piles
 - Axial Compression (LRFD 6.9.5 Composite)
 - Combined Axial load and Flexure (LRFD 6.9.2.2)
 - Flexural Resistance (LRFD 6.12)

Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5	Table 11.3-5
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



11

Bridge Scour – Pile Design

Table 11.3-5

- CIP Piles (LRFD 5.6.4 vs LRFD 6.9.5)**
 - Simplified Practices - Table 11.3-5
 - Following LRFD 5.6.4 Concrete Member
 - $\phi = 0.75$ (compression concrete) – LRFD 5.5.4.2
 - $k_c = 0.85$
 - Non-Simplified Practices
 - Following LRFD 6.9.5 Composite Member
 - $\phi = 0.60$ (compression of pipe pile and severe pipe pile damage) – LRFD 6.5.4.2

* Per LRFD 5.6.4

Factored Axial Resistance*

$$P_r = \phi 0.80 k_c f'_c A_c$$

$$P_r = 0.51 f'_c A_c$$

* Neglecting steel shell and rebar, fully supported.

* Under WBM Consideration

Factored Axial Resistance*

$$P_r = \phi 0.85 f'_c A_c$$

$$P_r = 0.51 f'_c A_c$$

Shell Rebar Concrete

$$P_r = P_s + C_s P_{sc} + C_r P_{rc} + C_c P_{cc} \quad (6.9.5.1-4)$$

12

Bridge Scour – Pile Design

- Other Considerations
 - **Pile Corrosion Mitigation:**
 - Avoidance - Concrete Pile Encasement (Pile Encased Pier)
 - Redundancy/Resistance – Add Longitudinal Reinforcement (Exposed Pile Bent Pier)
 - Protection - Exposed Sections Painted
 - **CIP Pile – Composite Action (WSDG guidance Under Consideration)**
 - For Non-Simplified Practices (e.g. Unbraced columns, lateral loads, etc.)
 - Corrosion Mitigation in corrosive and non-corrosive environments
 - Composite Action – LRFD 6.9.5
 - Steel Shell – Design Thickness (TDD)
 - $TDD = 1.25 \times (t - t_{corrosion})$
 - $TDD = 1.25 \times t_{corrosion}$

} Typically limited to 50% x nominal shell thickness for in-service evaluations.

- Composite Action – LRFD 6.9.6 (Not being considered)

13

Scour for Design vs. Scour for Evaluation

- **Scour for Design – ability to accommodate**
 - LPILE, FEA software, FB-MultiPier
 - Specs that guarantee behavior or anticipate corrosion
- **Scour for Evaluation – what is ok?**
 - Identify at-risk structures (based on hydraulic analysis)
 - Evaluate in-service scour reported thru inspections
 - Can be robust, but some simplified/conservative tools are helpful

14

Level of Uncertainty in Global Stability

- **Initial review – what does the bridge look like?**
- **Short-fixed bridges – low level of uncertainty**
 - Stiff abutments, flexible (braced) piers (pile encased, open pile bents)
 - Small lateral loads
 - Generally, allows larger exposure of piles
- **Long-expansion bridges – high level of uncertainty**
 - Unbraced substructure elements
 - Significant lateral loads

15

LRFD BDS 6.15.3

- Interaction 6.15.3.2 → 6.9.2.2
- Buckling 6.15.3.3 → 6.9.4 or 6.9.5
 - In essence scour is compromising our Pr, potentially Mr, and increasing second-order effects

6.15.3.3—Buckling

Instability of piles which extend through water or air shall be accounted for as specified in [Article 6.9.2](#). Piles which extend through water or air shall be assumed to be fixed at some depth below the ground. Stability shall be determined in accordance with provisions in [Article 6.9.2](#) for compression members using an equivalent length of the pile equal to the laterally unsupported length, plus an embedded depth to fixity. The depth to fixity shall be determined in accordance with [Article 10.7.3.3.2](#) for battered piles or P-A analysis for vertical piles.

6.15.3.3

An approximate method acceptable to the Engineer may be used in lieu of a P-A analysis.

BUREAU OF STRUCTURES

16



LRFD BDS 6.15.3

- Drivability Resistance versus Structural Resistance
 - ★ Drivability for various reasons controls (i.e. we have some margin in the structural resistance)
- One approach is to relate driven resistance to remaining structural axial resistance – subtracting out or accounting for key considerations (next)

BUREAU OF STRUCTURES

17



Key Considerations

- Remaining embedment
- ★ Lateral Loads – makes a big difference
 - 4% lat ~ 50% reduction in strength (nonlin analysis)
- Section properties
 - Account for SL?
 - Consider Concrete plus portion of steel shell for CIP
- More explicitly stated in 6.15.3.3
 - “effective length” i.e. “K”
 - Use k from table
 - Linear Buckling (Eigenbuckling) Analysis – Fe/Pe directly
 - Depth to Fixity / Point of Fixity
 - P-y software (Lpile)
 - Davison method
 - 10'

Effective length factor, K	(a)	(b)	(c)	(d)	(e)
Fixed-End	0.5	0.7	1.0	1.0	2.0
Fixed-Free	0.5	0.8	1.0	1.2	2.0

BUREAU OF STRUCTURES

18



Other Variables

- ★ Section and material properties significant variable in "stable" region
- ★ Unbraced length primary variable in "unstable" region
- Could consider operating level loads, but shifting line down, doesn't help much

The graph plots Capacity (kips) on the y-axis (0 to 250) against Unbraced length (ft) on the x-axis (0 to 50). A vertical red line at approximately 30 ft separates the 'Stable Region' (to the left) from the 'Unstable Region' (to the right). Several curves represent different load cases: 'No SL (P100)', 'No SL (P100)', '20% SL (P100)', '50% SL (P100)', 'Full', and 'LRFD SL 11.3.3.1'. The curves generally show a decrease in capacity as unbraced length increases, with a sharp drop-off in the unstable region.

19

Questions?

A photograph showing a concrete bridge structure over a body of water. The water is calm, and the sky is overcast. The bridge has a simple design with a flat deck and a concrete support structure. The foreground shows some rocks and vegetation along the water's edge.

20

CONSULTANT REVIEW

Max Kulick, P.E.
Final Review Engineer

2026 WisDOT Structural Engineers Symposium

1

Consultant Review CONTACTS

Supervisor
Najoua Ksontini

<p>Preliminary Review</p> <p>Ruth Coisman <i>Program Manager</i></p> <p>Ann-Marie Kirsch <i>Hydraulics Review Engineer</i></p> <p>Consultant Partners</p>	<p>Final Review</p> <p>Jon Resheske <i>Program Manager</i></p> <p>Emily Kuehne <i>Review Engineer</i></p> <p>Max Kulick <i>Review Engineer</i></p> <p>Consultant Partners</p>
--	--

Records Coordinator
Sarah Wright

2

Review Reminders

NON-STANDARD DESIGNS
contact Ruth ahead of Preliminary E-Submit if doing something weird

- not following abutment tables
- high skew
- open railing [state system]
- 3-sided structures/precast
- lack of freeboard
- high level aesthetics
- <0.5% grade [state system]
- shallow foundations
- non typical DNR requests

SSR
include relevant project information/justifications (we do look at this)

RATINGS
contact BOS Rating Unit ahead of Preliminary/Final E-Submit for things like:

- using refined analysis
- nonconventional designs with special primary members
- low ratings
- different super structure types within same structure number
- potential for load posting

SCOPE OF WORK
rehabilitation plans should include Scope of Work list in Preliminary and Final plans

3

Review Reminders

BRIDGE MANUAL
follow bridge manual guidance

PRELIMINARY PLAN COMMENTS
include responses to preliminary plan comments with Final plan submittal

LINEWORK
label utility lines in plans

QA/QC
follow your procedures and do not rely on BOS to catch your errors

BID ITEMS
double check bid item numbers and names
do not include bid item extension numbers on structure plans

THINK LIKE A CONTRACTOR
What information is needed to bid on the work?

4

“What can we do to make your job easier?” – Consultant

- **Include Structure Number in Subject Line of Emails to BOS.**
We track projects by structure number rather than design/construction ID.
- **Tell us why you are (re)E-Submitting.**
Add note to 'Comments' box, this helps keep track of incoming submittals.
Updated Plans for BOS Comments/BPD Comments/DNR/Region/Bid Items
Provide Information About The Submittal. All Fields In This Section Are Required.
Comments (Max 50 characters)
- **Consultant Reviewers**
We work closely with a handful of consultant's that complete reviews for us. When they attend meetings or respond to emails, know that they are representing BOS.

5

Addenda and Post-Let

- **Tell us why you are E-Submitting Addenda/Post-Let**
Ahead of E-Submit send Email to Jon and Najoua to briefly explaining the changes. This helps us process and review Addenda/Post-Let Revisions timely.
- **Timing**
On-Time Addenda delivery to BPD is no less than 2 weeks before LETTING
Reach out to BPD and Jon if you are not going to meet that.
- **Review FDM 19-22**
- **Reminders:**
 - only include sheets that have changes
 - stamp each sheet
 - linework/text that changed should also be red in addition to cloud and symbol

6

Thank You!
Questions?



**Main Street, City of Oshkosh
Fox River Bridge**

Dan Machamer
Hardesty & Hanover, LLC.




WisDOT Structural Engineers Symposium

May 26, 2026



1

Introduction – Movable Bridges in WI







2

Introduction – Movable Bridges in WI

Types

- Now 44 movable highway bridges in Wisconsin
 - 10 vertical lift
 - 16 trunnion bascule
 - 18 rolling lift bascule
- 21 movable highway bridges in NE Region
 - 15 rolling lift bascule

3



4



5




6

Rolling Lift Bridges

Overview

- Bascule girder rolls on tracks with curved treads (no trunnion)
- Other differences from trunnion bascules
 - Operating machinery usually on-board (moves with the bridge)
 - Bridge usually driven with a rack and pinion
 - Rear roadway break usually behind pinion
 - Rear locks usually required
 - Center lock usually Scherzer-Style jaw and diaphragm



7

Rolling Lift Bridges

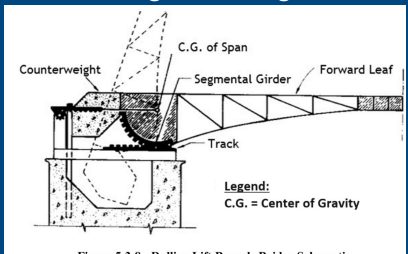

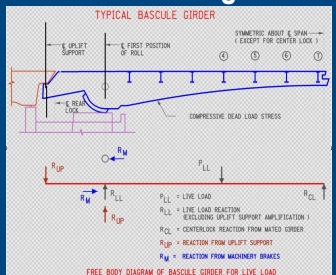


Figure 5.3.8 Rolling Lift Bascule Bridge Schematic
(from FHWA 2023 BIRM)



8

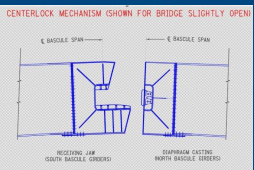
Rolling Lift Bridges



TYPICAL BASCULE GIRDER


SYMMETRIC ABOUT E SPAN (EXCEPT FOR CENTER LOCK)

FREE BODY DIAGRAM OF BASCULE GIRDER FOR LIVE LOAD



CENTERLOCK

RECEIVER JAW (SOUTH BASCULE GIRDERS)
DIAPHRAGM CASTING (NORTH BASCULE GIRDERS)



9

Project Need


Structural Elements

- Corrosion and deterioration of the steel components
- Failure of the paint system
- Open grid deck surface wear
- Concrete deck delamination




13


Main St Bascule Bridge



Bascule Deck Grating



Center Break

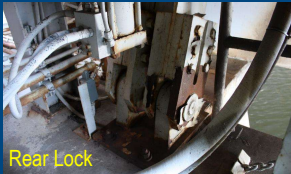


14


Project Need

Mechanical and Hydraulic Elements

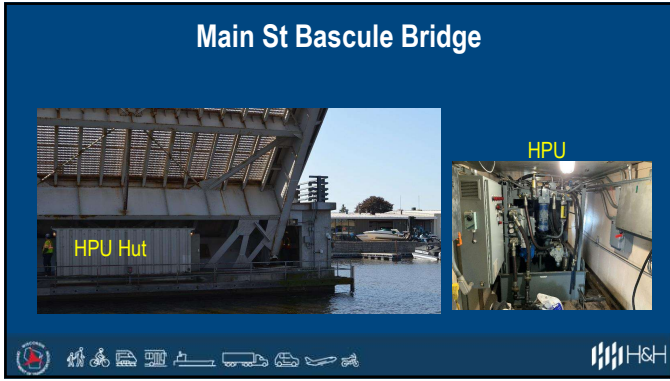
- Hydraulic elements in poor condition (25+ years old)
- Cylinders, piping and hoses in poor condition
- HPU Enclosures congested and worn.
- Components near end of their useful life



Rear Lock



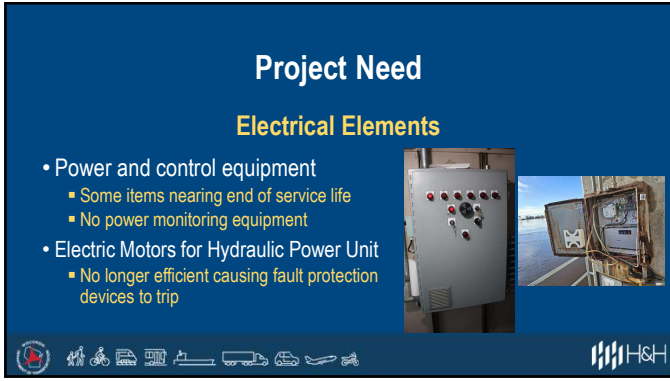
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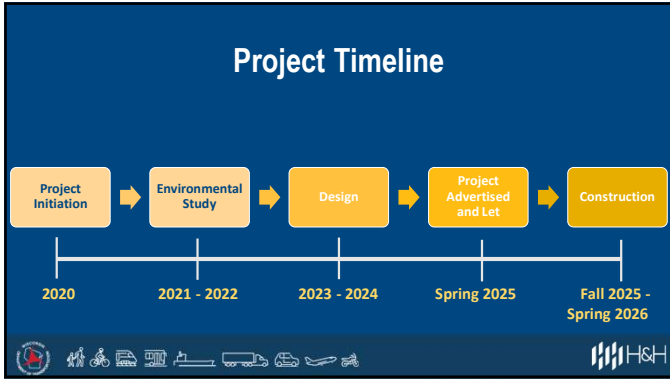
16



17



18



19

- Improvements**
Structural Elements
- Replace the deteriorated stringers with new galvanized beams
 - Complete abrasive blast cleaning and new full paint system
 - New galvanized open steel grid deck
 - Scarify the concrete decks and apply concrete overlay
 - Replace approach span deck joints
 - Repairs to the operator house (windows & roof)
- H&H

20



21



22



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25



26



27



28



29



30



31



32

Improvements

Mechanical and Hydraulic Elements

- Replace the bridge lifting hydraulic cylinders
- Replace the rear locking hydraulic cylinders
- Replace all hydraulic piping & hoses
- Install hydraulic fluid heating loops
- Replace Hydraulic Power Unit enclosures
- Rebalance the bridge leaves

 The slide has a blue background with white text. At the bottom, there is a navigation bar with icons for various modes of transport and the H&H logo.

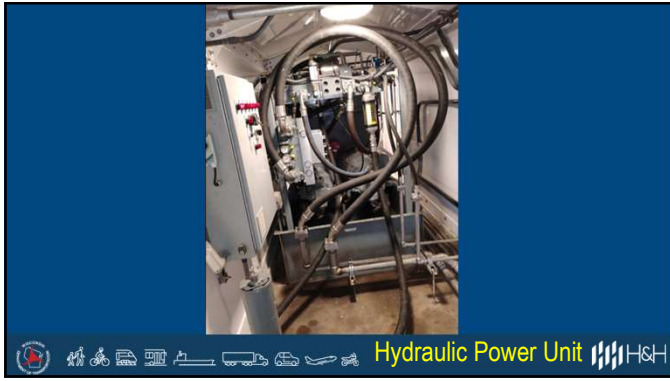
33



34



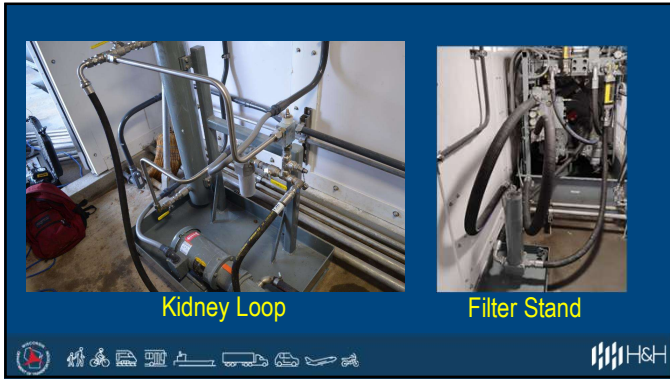
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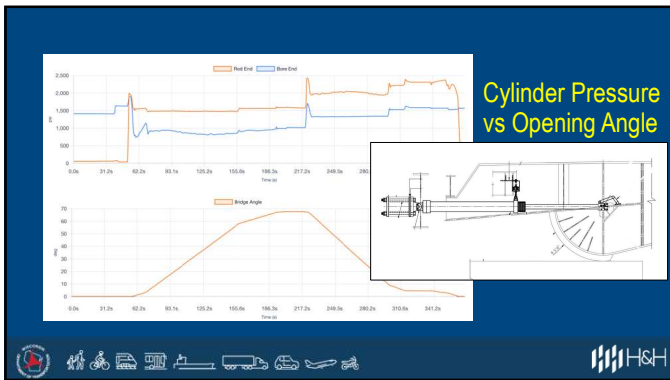
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39



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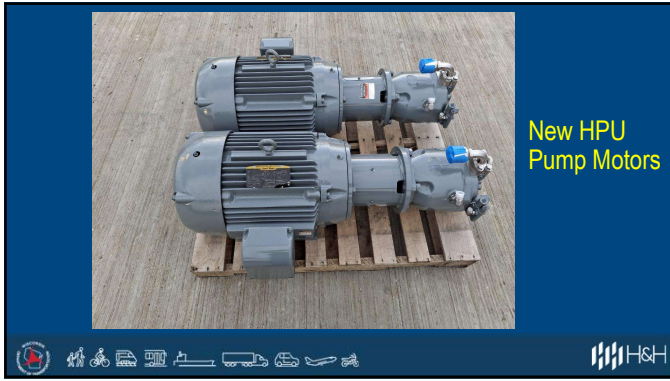
41

Improvements

Electrical Elements

- Replace the electric motors for hydraulic power units
- Integrate new elements into the existing PLC system
- Install new power monitoring equipment
- Replace the control console desktop

42



New HPU Pump Motors

43



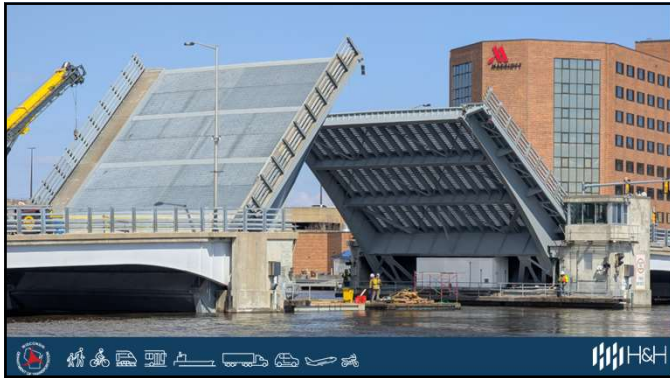
Operator Room

44



Control Console



45



46

Conclusion

- Bridge opened to roadway traffic and navigation on April 17, 2026
- Many different parties involved
- Cooperation between WisDOT, the Engineer of Record, the construction team, and the contractor is critical to a successful movable bridge rehabilitation project






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Thank You!



Questions?

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Design-Build Update
Structural Engineering Symposium
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 WisDOT Structures Development Chief

May 26, 2026

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WisDOT Design-Build Progress


- 2019 Legislation for Design-Build Pilots
 - \$250,000,000
 - Up to 6 projects
 - Required: Best Value, Fixed Price Variable Scope, and Low Bid Contracts
- Permanent Legislation signed October 2, 2025
 - \$300M / biennium encumberment limit
- WisDOT Design Build website for developments and project information: www.WisconsinDOT.gov/DesignBuild



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Why use Design Build?


- Provides condensed timeframe because design and construction overlap
- Efficiencies in design and construction - designer and contractor are a TEAM
- Opportunity for innovation - get contractor's input early in the process



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Types of Design Build Contracts



- Low Bid
 - Technical Proposal is Pass/Fail
 - Responsive Bidder + Lowest Bid = Award
- Fixed Price Variable Scope
 - Work is prioritized
 - Bidder who can do the most work within Budget= Award
- Best Value
 - Technical Proposal = Part of Score
 - Total project cost = Part of Score
 - Team with highest score = Award



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Brief Review of Pilot Projects


- College Avenue (NE Region)
 - Best Value Contract
 - Replaced a box culvert
 - Construction Complete

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Benefits – College Avenue

- Very fast construction time (limited closure)
- Reduced impact on local businesses and traffic



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Brief Review of Pilot Projects


- Lone Rock (SW Region)
 - Best Value Contract
 - Replaced three truss bridges
 - Two new retaining walls
 - Moved southern intersection
 - Construction Complete




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Benefits – Lone Rock ATCs Alternative Technical Concepts (ATC)


- Redesigned bridge piers: lowered the cost, reduced pier material, reduced impacts to sensitive wetlands and added aesthetic benefits
- Reduced the number of bridge spans: lower cost, less maintenance, shorter construction time, improved hydraulics, and reduced impacts to sensitive wetlands
- Changed retaining wall type: reduce road closure time, shorten construction time
- Kept STH 130 open during construction (originally scheduled to be closed during construction)



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Benefits – Lone Rock



- New structures opened two years ahead of schedule
- Design-Build allowed for flexibility during construction for field design changes of rock wall
- Reduced forest wetland impacts with modifications to staging plans and access points



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Brief Review of Pilot Projects


- **Cranberry Interchange (SW Region)**
 - Low Bid Contract
 - Replaced two bridges on IH 94
 - Construction Complete
 - Trees planting next year

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Benefits - Cranberry Interchange


- Proposals due June 24, 2025
- Construction Completed by Memorial Day Weekend 2026
- ATC for Traffic Staging shortened construction timeline



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Brief Review of Pilot Projects



- **US 51 – Marathon County “WRAP” (NC Region)**
 - Fixed Price Variable Scope Contract
 - Fixed project elements - Pavement Preservation, Guardrail Replacement
 - Variable Scope – Thin Polymer Overlays
 - Currently in Construction



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Brief Review of Pilot Projects

- Rock/Crawfish ("SE" Region)
 - Best Value Contract
 - Technical Proposals due May 19, 2026
 - Cost Proposals due June 9, 2026
 - Contract execution end of July
 - Construction starts end of 2026

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MNDOT Led Blatnik Bridge Replacement




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Blatnik Bridge

- Best Value Contract
- Minnesota led and administered project
 - check MNDOT Sharepoint site
- Tied arch or cabled stay structure option
- Proposals Due & Award Anticipated June 2026
- Major Construction start Spring 2027



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What's next?

- Mirror Lake
 - Best Value Contract
 - Request for Qualifications – Fall 2026
 - Request for Proposal - Fall 2026
 - Proposals due Spring 2027
 - Construction – Fall 2027 to Fall 2030




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What's next?


Project Location:



- Mirror Lake
 - Expand mainline I-90/94 to three lanes
 - Diverging Diamond Interchange @ US 12
 - Replace six mainline bridges
 - US 12
 - Ishnala Rd
 - Mirror Lake
 - Replace Xanadu Rd over I-90/94




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Discussion or Questions

- Thank you!
- Laura.Shadewald@dot.wi.gov
- <https://wisconsin.gov/designbuild/>



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BUREAU OF
STRUCTURES

WisDOT Structural Engineers Symposium

Survey QR Codes and Links

May 26, 2026

Interactive Survey



<https://forms.office.com/g/a6rjxU1MtN?origin=lprLink>

Post-Event Survey



<https://forms.office.com/g/Zj4kT95meC?origin=lprLink>

Conference Location: Madison College
1701 Wright Street, Room D1630
Madison, WI 53704

For today's presentations, agenda, and proof of attendance, please visit:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/strct/research.aspx>

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