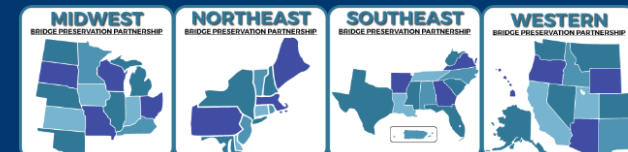


Navigating the Transition: Wisconsin DOT's Journey to SNBI Compliance

Philip Meinel, PE – WisDOT

Todd Demski, PE – Fickett Structural Solutions, Inc.



Wisconsin DOT's Journey to SNBI Compliance

- Discuss WisDOT's bridge inspection program background
- Discuss SNBI conversion contract
- Discuss WisDOT's database and conversion process
- Lesson Learned through the process

WisDOT's Bridge Inspection Background

- State Bridges
 - State DOT inspectors supplemented by consultants
- Local Bridges
 - Local forces and consultants
- Database developed and maintained in house
 - Allowed WisDOT to start process early



SNBI Contract Background

- Contract broken into four parts
 - Half-Day prerequisite
 - 1-Day in-person training course
 - Update WisDOT Field Manual
 - Course instruction



SNBI Contract: Field Visits

- Field visits - prior to starting class development
 - One day with WisDOT BOS and Fickett staff
 - Policy based
 - Determine areas where SNBI manual needed clarification
 - Identify conflicts with WisDOT policies



SNBI Contract: Field Visits

- Field Visits - prior to starting class development
 - One day Fickett staff only
 - Production/pace based
 - Replicate true routine inspection conditions (SNBI Only)
 - Be able to answer the questions “How much longer will this take me?”



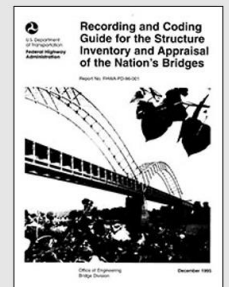
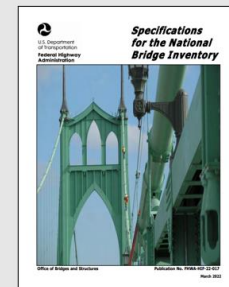
SNBI Contract: Prerequisite

- Prerequisite objectives
 - Discuss SNBI timeline, format, many-to-one, terminology, etc.
 - Span Material and Type
 - Substructure Material and Type
 - Bridge Geometry
 - Features and Routes
 - Each Inspection Items
 - Condition Rating Changes

Changes to the NBIS

- Inventory

- “Specifications for the National Bridge Inventory” (SNBI) must be used to collect and record NBI data
- SNBI supersedes the “Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation’s Bridges” (CG)



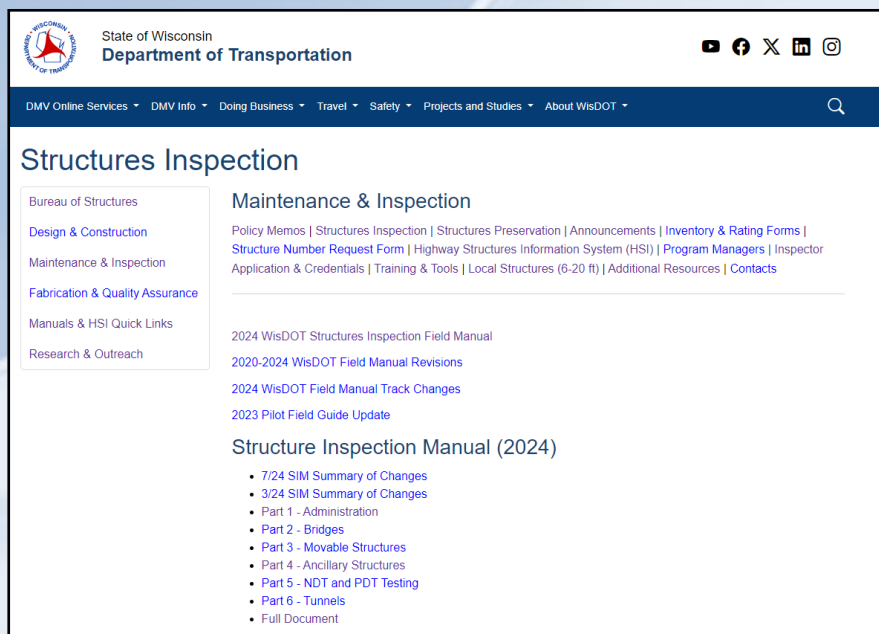
SNBI Contract: In-Person Class

- Overview of prerequisite
- SNBI inventory items: In-depth examples
 - Features, Span Material, Substructures, Roadside Hardware
- Appraisal and measurements
 - Highways, Railroad, Waterways, Insp. Req., Appraisals
- Condition ratings
- WisDOT policies
- Field Manual changes



SNBI Contract: Field Manual

- Review the major updates on the WisDOT Field Manual
- WisDOT Structure Inspection Manual

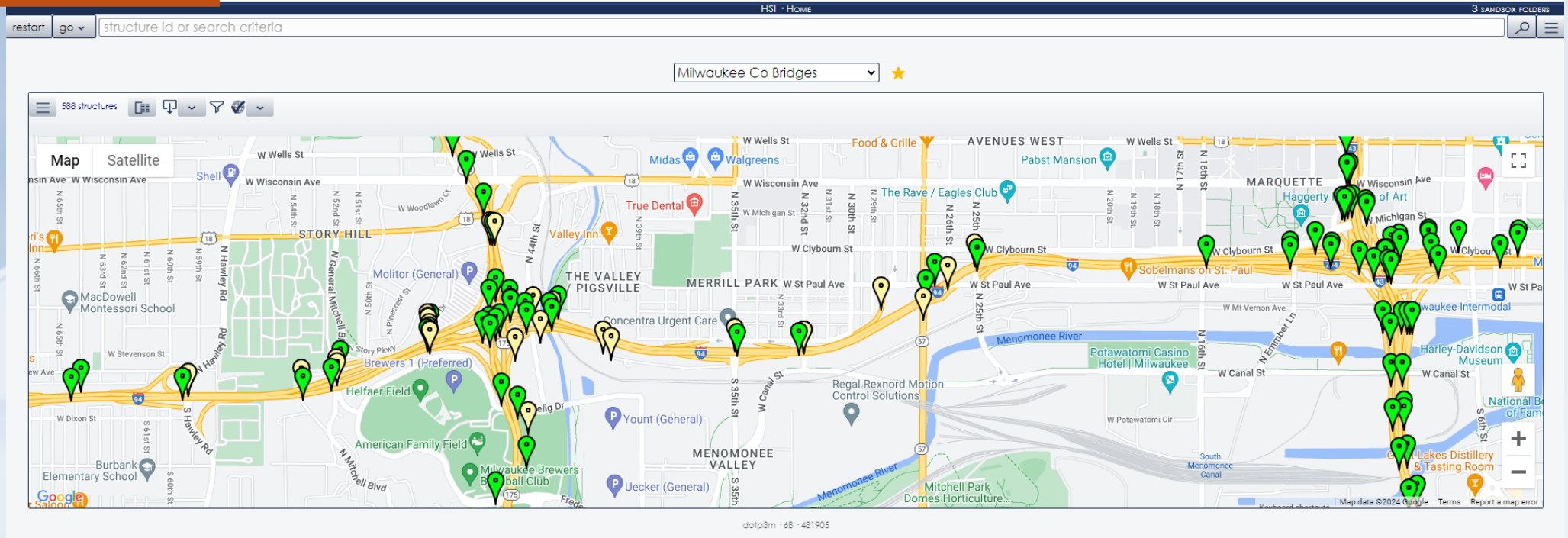


WisDOT Database Overview

- Highway Structures Information System (HSI)
 - Early 2000's initial development
 - Imported CoRE inspections from Pontis
 - 2014 AASHTO elements
 - Similar training effort for inspectors – State and Local
 - 2015 Mobile inspection
 - Part of ongoing inspector training
 - 2016 Added ancillary structures inspection
 - Small bridges (<20' span), retaining walls, noise walls, and sign structures
 - 2021 EV ratings
 - Further integrating rating data and documentation

WisDOT Database & SNBI Conversion Process

- Highway Structures Information System (HSI)
 - **Inventory** and inspection data



WisDOT Database

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General

Identification Location Map Draw File Program manager Construction Maintenance Improvement Route Clearance Special component Media Event Attribute / relationship Security

Bridge

Main Abutment Pier Span Geometry Approach Sufficiency Capacity Rating Hydraulic Expansion joint Appraisal ADT

Inspection

Create History Interval

save cancel
dotp3m - 68 - 482417

WisDOT Database

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General

Identification Location Map Draw File Program manager **Construction** Maintenance Improvement Route Clearance Special component Media Event Attribute / relationship Security

Year 2022 Work performed Overlay - Polymer

Year 2014 Work performed New Structure

- Bridge
- Inspection
- Overlay - Bituminous
- Overlay - Concrete
- Overlay - Concrete - New Joints
- Overlay - Concrete - New Rail & Joints
- Overlay - Pma
- Overlay - Polyester
- Overlay - Polymer
- Overlay -Concrete - Widen
- Paint Bearing
- Paint Railing
- Painting
- Painting - Spot
- Raise Structure
- Reconstruction
- Remove Median
- Remove Overburden
- Repair Bearing
- Repair Box Culvert**

save cancel dotp3m -68 -482617

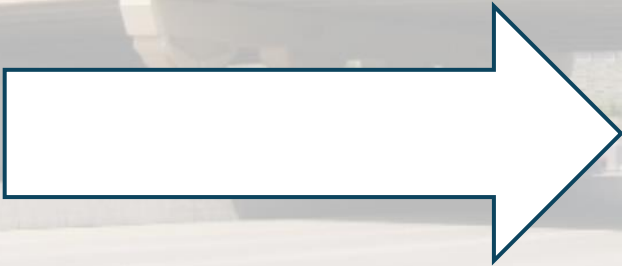


Table 29. Bridge replacement code.

Code	Description
BR1	Replaced

Table 30. Bridge improvement codes.

Code	Description
IP1	Widened
IP2	Raised
IP3	Strengthened by retrofit
IP4	Seismic retrofit

Table 31. Rehabilitation codes for deck, superstructure, substructure, and culvert.

Deck	Code			Description
	Superstructure	Substructure	Culvert	
DK1	SP1	SB1		Replaced
DK2	SP2	SB2	CU2	Major Rehabilitation
DK3	SP3	SB3	CU3	Minor Rehabilitation

Table 32. Preservation codes for deck, superstructure, substructure, and culvert.

Deck	Code			Description
	Superstructure	Substructure	Culvert	
DK4			CU4	Overlaid
DK5	SP5	SB5	CU5	Sealed
	SP6	SB6	CU6	Coating (New or Replaced)
	SP7	SB7	CU7	Coating (Preserved)

Table 33. Other preservation codes.

Bearings	Deck Joints	Bridge Railings or Transitions	Code			Channel	Description
			Scour Counter-measures	Channel Protection			
BG1	JT1	RT1	SC1	CP1		Installed or Replaced	
BG2	JT2	RT2	SC2	CP2		Repaired	
					CH1	Condition Improved	

WisDOT Database

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General

- Identification
- Location
- Map
- Draw
- File
- Program manager
- Construction
- Maintenance**
- Improvement
- Route
- Clearance
- Special component
- Media
- Event
- Attribute / relationship
- Security



17 item(s) filtered

Action item	Status	Complete (yr)	Status change
Approach - Wedge Shoulder/Sidewalk	Identified/recommended		06/27/2024
Misc - Remove Vegetation (Spray)	Identified/recommended		06/26/2024
Approach - Seal Approach to Paving Block	Identified/recommended		06/26/2024
Approach - Seal Joint along Parapet/Wing	Approved for Work Order Assignment		02/18/2024
Misc - Tighten Bolts and Nuts	Approved for Work Order Assignment		11/02/2022
Approach - Mud or Foam Jacking	Approved for Work Order Assignment		11/02/2022
Drainage - Repair/Replace Deck Drains/Inlets	Approved for Work Order Assignment		11/02/2022



WisDOT Database

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General

Identification Location Map Draw File Program manager Construction Maintenance Improvement **Route** Clearance Special component Media Event Attribute / relationship Security

On

On Under

Cardinal Non-Cardinal

Primary

Local system
LRD

Route number
[]

Direction
North

Designation type

Designated national network

Location
0.5 MI S JCT USH 18

Feature name
S 76TH ST

Highway feature designation
Mainline

Highway on inventory route
Not on NHS (NON)

Strategic highway network designation
Not STRAHNET hwy (0)

delete

Under

On Under

Cardinal Non-Cardinal

Primary

Local system
IH

Route number
94

Direction
East

Designation type

Designated national network

Location
0.6M E JCT STH 181 TO N

Feature name
IH 94

Highway feature designation
Mainline

Highway on inventory route
On NHI (NHI)

Strategic highway network designation
Interstate STRAHNET hwy (1)

delete

Under

On Under

Cardinal Non-Cardinal

Primary

Local system
IH

Route number
94

Direction
West

Designation type

Designated national network

Location
2.0M W JCT USH 41 TO N

Feature name
IH 94 WB

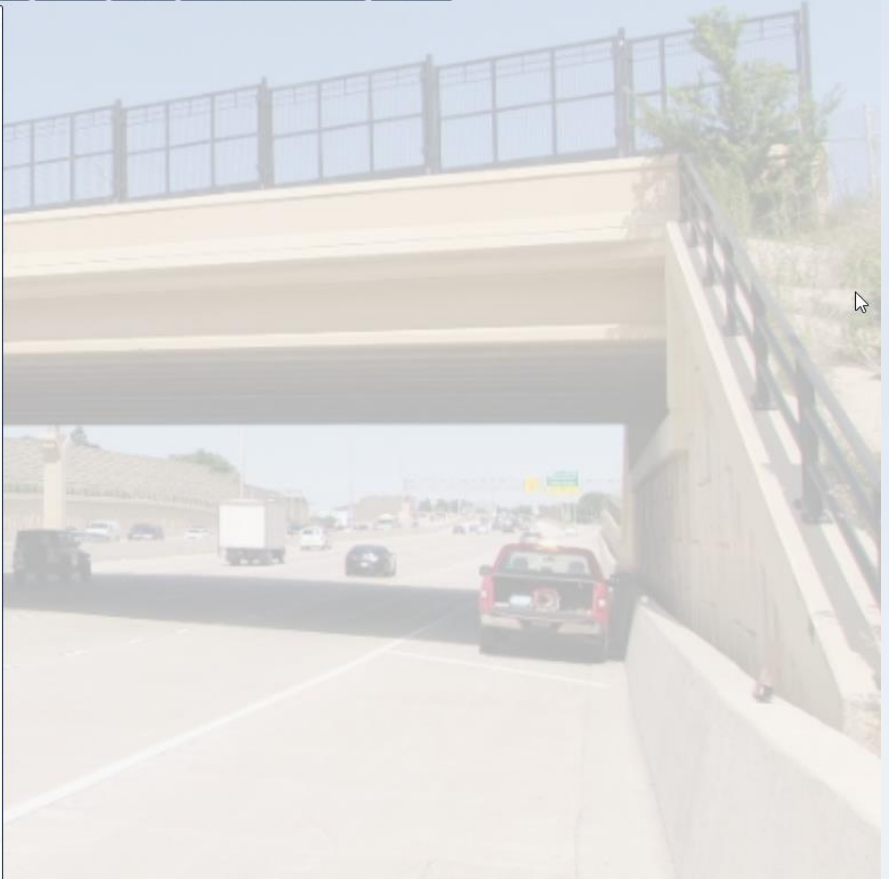
Highway feature designation
Mainline

Highway on inventory route
On NHI (NHI)

Strategic highway network designation
Interstate STRAHNET hwy (1)

delete

add



WisDOT Database

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General

Identification Location Map Draw File Program manager Construction Maintenance

Improvement Route **Clearance** Special component Media Event Attribute / relationship Security

Under cardinal

Direction: East

Min vertical (ft): 16.98 Min vertical date: 08/20/2018

Min horizontal (ft): 90.0

Min left lateral (ft): 18.0 Min right lateral (ft): 12.0

Under non-cardinal

Direction: West

Min vertical (ft): 19.56 Min vertical date: 10/17/2016

Min horizontal (ft): 90.0

Min left lateral (ft): 18.0 Min right lateral (ft): 12.0

On cardinal

Direction: []

Min vertical (ft): [] Min vertical date: mm/dd/yyyy

Min horizontal (ft): []

Min left lateral (ft): [] Min right lateral (ft): []

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General

Identification Location Map Draw File Program manager

Construction Maintenance Improvement Route Clearance

Special component Media Event Attribute / relationship Security

Special component type

- Conc. Protective Treatment - Tk - 590 - 90
- Corrosion Protection - Cathodic Protection System
- Corrosion Protection - Weathering Steel
- Deck - 1" Thicker Deck, 3.5" Top Clear Cover
- Deck - 10" Thick
- Deck - Corrugated Steel Flooring - Asphalt Filled
- Deck - Drip Edge Repair
- Deck - Epoxy Injection
- Deck - Fibers Embedded In Mix
- Deck - Frp Deck Systems
- Deck - Galvanized Stay - In - Place Forms
- Deck - Hpc Fibers
- Deck - Post Tensioned
- Deck - Precast Panels
- Deck - Protective Netting Installed
- Deck - Sheet Membrane
- Deck - Stainless Steel Bars - Clad
- Deck - Stainless Steel Bars - Solid
- Deck Crack Sealer - 10 - Minute Concrete Mender
- Deck Crack Sealer - Crack Repair Slv

WisDOT Database

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General

Bridge

Main **Abutment** Pier Span Geometry Approach Sufficiency Capacity Rating Hydraulic Expansion joint Appraisal ADT

Cardinal Direction
North

Type
Sill (A1) - Semi Exp

Foundation
Pile - Cast In Place

Piling size
356 Mm (14")

Slope protection type
Solid Conc

Wing
Parallel To Roadway

Bridge roadway width (ft)
72.0

Deck width (ft)
96.0

Right wingwall length(ft)
49.0

Left wingwall length(ft)
34.3

Skew
Direction Degrees
 Left Right

delete

Translated

New

SNBI
Substructure material SB.03
Reinforced concrete - cast-in-place (C01)

Substructure protective system SB.05
None (0)

Foundation protective system SB.07
Other (X)

WisDOT Database

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General

Bridge

Main Abutment **Pier** Span Geometry Approach Sufficiency Capacity Rating Hydraulic Expansion joint Appraisal ADT

Number
1

Type
Bent - Multiple Hammerhead

Foundation
Pile - Cast In Place

Piling size
356 Mm (14")

Skew
Direction Degrees
 Left Right

SNBI
Substructure material SB.03
Reinforced concrete - cast-in-place (C01)

Substructure protective system SB.05
None (0)

Foundation protective system SB.07
Unknown (U)

delete

Translated

New

WisDOT Database

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General

Bridge

Main Abutment Pier **Span** Geometry Approach Sufficiency Capacity Rating Hydraulic Expansion joint Appraisal ADT

Number	Configuration
<input type="text" value="1"/>	<input type="text" value="Girder/Beam - I-Shaped Spread - Ps Wide"/>
<input checked="" type="checkbox"/> Main	Material
Type	<input type="text" value="Prest Concrete"/>
<input type="text" value=""/>	Girder truss height (in)
Length (ft)	<input type="text" value="45.0"/>
<input type="text" value="106.0"/>	Girder truss spacing (ft)
	<input type="text" value="9.2"/>

SNBI

Number of beam lines SP.03

Span material SP.04

Span protective system SP.07

Deck material and type SP.09

Wearing surface SP.10

Deck protective system SP.11

Deck reinforcing protective system SP.12

Deck Stay-In-Place forms SP.13

WisDOT Database

HSI - B-40-785


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General

Bridge

Main Abutment Pier Span **Geometry** Approach Sufficiency Capacity Rating Hydraulic Expansion joint Appraisal ADT

Length (ft) <small>item 49</small> 216.0	Lane count on 4	Skew Direction <input type="radio"/> Left <input checked="" type="radio"/> Right Degrees 17	SNBI
Deck area (sf) 20736	Lane count under 10		NBIS bridge length <small>G.01</small> 208.1
Roadway area (sf) 15552	Median type Concrete = 152 Mm (6")		Curved bridge <small>G.12</small> Not curved (N)
Sidewalk left width on (ft) 7.0	Median width on (ft) 10.0	Horizontal curve on radius (ft)	Maximum bridge height <small>G.13</small> 26
Sidewalk right width on (ft) 7.0	<input checked="" type="checkbox"/> National bridge inventory length	Horizontal curve direction <input type="radio"/> Left <input type="radio"/> Right	

WisDOT Database

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General
Bridge

Main Abutment Pier Span Geometry Approach Sufficiency Capacity Rating Hydraulic Expansion joint **Appraisal** ADT

NBI

Deck Rating <small>item 58</small>	Structure evaluation appraisal <small>item 67</small>
<input type="text" value="Good (7)"/>	<input type="text" value="7-Cond Better Than Min Criteria"/>
SuperStructure Rating <small>item 59</small>	Deck geometry <small>item 68</small>
<input type="text" value="Good (7)"/>	<input type="text" value="9-Cond Exceed Desirable Criteria"/>
SubStructure Rating <small>item 60</small>	Underclearance appraisal <small>item 69</small>
<input type="text" value="Good (7)"/>	<input type="text" value="6-Cond Equal To Min Criteria"/>
Channel Rating <small>item 61</small>	Bridge posting <small>item 70</small>
<input type="text" value="N/A (N)"/>	<input type="text" value="Legal Load Stress Not Exceeded (5)"/>
Culvert Rating <small>item 62</small>	Waterway Adequacy <small>item 71</small>
<input type="text" value="N/A (N)"/>	<input type="text" value="N/A (N)"/>
	Approach roadway alignment <small>item 72</small>
	<input type="text" value="Good- No speed reduction (8)"/>
	Last inspection date <small>item 90</small>
	<input type="text" value="06/24/24"/>

SNBI

Inspection requirements	Component condition ratings	Scour condition	Appraisal	Values
NSTM inspection required <small>IR.01</small>	Bridge railings condition <small>C.05</small>	Bridge joints condition <small>C.08</small>	Approach roadway alignment <small>AP.01</small>	<input type="button" value="show"/>
<input type="text" value="No (N)"/>	<input type="text" value="Satisfactory (6)"/>	<input type="text" value="N/A (N)"/>	<input type="text" value="Good (G)"/>	
<input type="checkbox"/> Fatigue details <small>IR.02</small>	Bridge railing transitions condition <small>C.06</small>	Channel condition <small>C.09</small>		
	<input type="text" value="N/A (N)"/>	<input type="text" value="N/A (N)"/>		
	Bridge bearings condition <small>C.07</small>	Channel protection condition <small>C.10</small>		
	<input type="text" value="N/A (N)"/>	<input type="text" value="N/A (N)"/>		

WisDOT Database

- Approximately 80% complete
- In process:
 - Roadside Hardware
 - Work Events
 - Feature ID
 - Routes
 - Load Rating

WisDOT Database

- Inspection verification
 - Tracking SNBI verification with activity type

home go

B-40-785 S 76TH ST over IH 94

General

Bridge

Inspection

Create History Interval

End date	Inspection type(s)	Agency	Inspector	Activity type(s)	QA Reviewed
06/24/24	R	CONSULTANT	Grove, James C (9747)	SIA,SNBI	
11/02/22	INT	STATE HIGHWAY DEPARTMENT	Martin, Nicholas R (2015)		
04/01/20	R	STATE HIGHWAY DEPARTMENT	Barsch, Leah (2021)		
08/20/18		STATE HIGHWAY DEPARTMENT	Bolka, John (2007)	VCV	
04/11/18	R	STATE HIGHWAY DEPARTMENT	Reay, Scott (2023)	SIA	

WisDOT Database

- Highway Structures Information System (HSI)

- Open access

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

The screenshot shows the homepage of the Highway Structures Information System (HSI) on the Wisconsin Department of Transportation website. The header includes the WisDOT logo and navigation menu items like 'DMV Online Services', 'DMV Info', 'Doing Business', 'Travel', 'Safety', 'Projects and Studies', and 'About WisDOT'. The main content area is titled 'Highway Structures Information System (HSI)' and features a sidebar with categories such as 'Bureau of Structures', 'Design & Construction', 'Maintenance & Inspection', 'Fabrication & Quality Assurance', 'Manuals & HSI Quick Links', and 'Research & Outreach'. The main content area is divided into 'Maintenance & Inspection' (with links to Policy Memos, Structures Inspection, Structures Preservation, etc.), 'Quick Links' (with links to HSI Application and HSI Quick Guide), and 'Updates and Release Notes' (with a link to Release Notes - October 2023). A red arrow points to the 'HSI Application' link in the Quick Links section.

The screenshot shows the login page for the WAMS (Web Access Management System). The header includes the WisDOT logo and the text 'State of Wisconsin Department of Transportation'. The main content area features the WAMS logo and a login form with fields for 'User ID:' and 'Password:', and a 'Login' button. Below the login form, there are links for 'Register for a Wisconsin User ID.', 'Edit your Profile.', 'Change your password.', and 'Forgot your password.'. A red arrow points to the 'Register for a Wisconsin User ID.' link. At the bottom, there is a disclaimer about the system's use and a link to 'WAMS Home'.

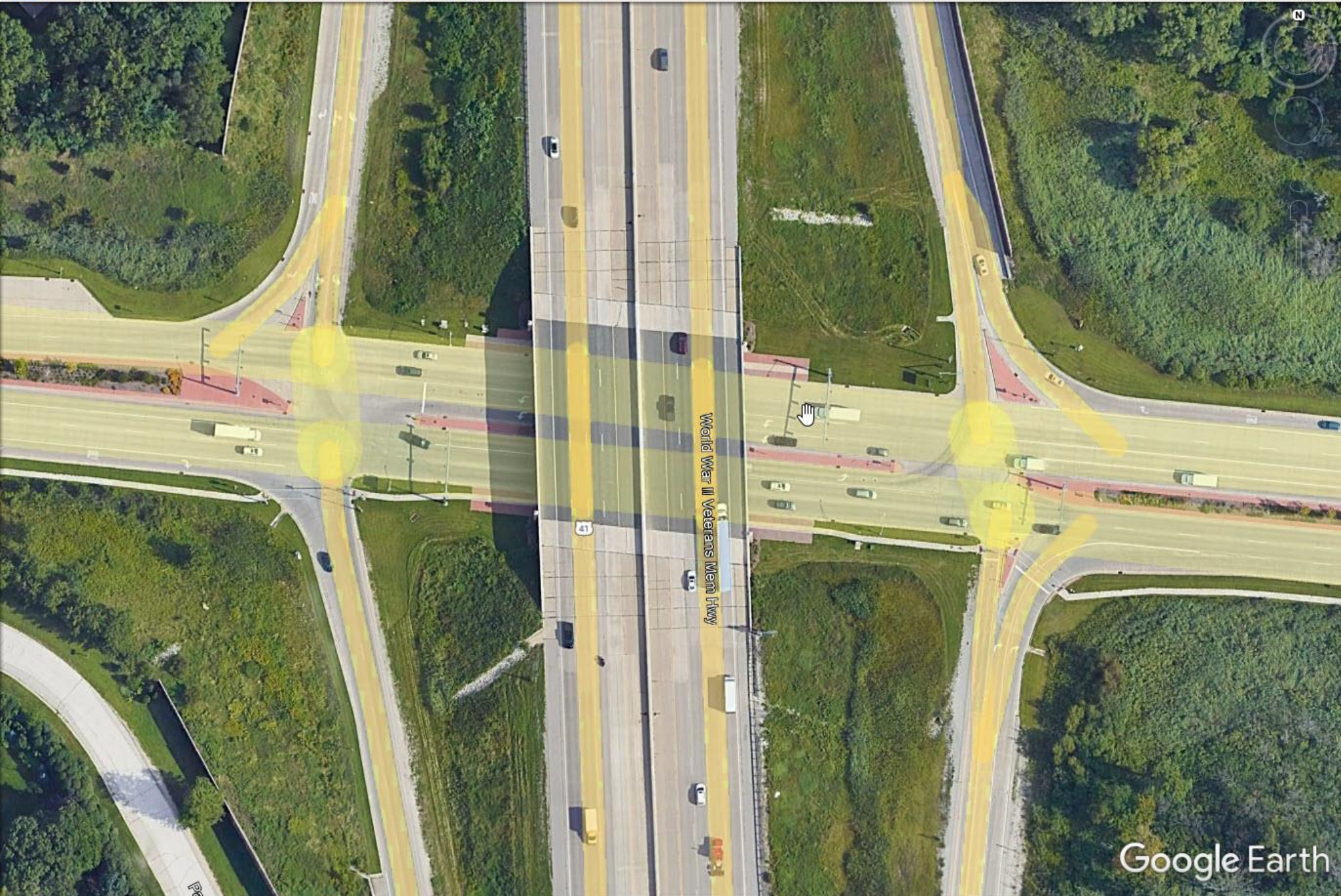
SNBI Lessons Learned

- Ability to separate top wearing surface from deck/slab element
 - Default wearing surface for top of original deck (SP.10)
 - Confirmed sacrificial wearing surface in WI Bridge Manual
 - Default value is Concrete – Monolithic (C01)
 - WI ADE 8000 Wearing Surface (Bare)
 - Deck/slab element condition based on underside/side only

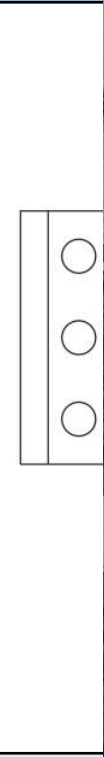
SNBI Lessons Learned

- Eight classes of new material = new questions
 - Inspectors, designers, state, local, consultants
- Database development team in 2nd last class
- Many “one-off” questions
- SNBI Manual ambiguity





S



Google Earth

1985

44°30'33.58" N 88°04'55.73" W elev 645 ft eye alt 1532 ft

SNBI Lessons Learned

- Substructures
 - Biggest drain on field inspection staff as not currently in HSIS
 - Plan/as-built reviews
 - Done prior to mobilization



SNBI Lessons Learned – Field Inspections

- Data prep is key
- A lot of time reviewing plans
 - Typically delegated to entry engineers or interns
 - Still need supervision from experience staff to make sure coding's and unique situations are correct
- Maximum bridge height
 - (B.G.13) - Culverts



SNBI Lessons Learned – Field Inspections

- Arches vs. Culverts (B.SP.01 and B.SP.06)



B. Superstructure

- The basic purpose of the superstructure is to transfer loads from the deck across the span and to the substructure.
- The superstructure supports the deck or riding surface of the bridge, as well as the loads applied to the deck.
- Superstructure elements may be categorized by their function (truss members will transmit mainly axial loads; girders will transmit mainly shear and flexure, etc.).
- Loads may be transmitted through tension, compression, bending, or a combination of these three.
- These elements typically do not include bracing components such as diaphragms, laterals, and cross bracing.
- Prefabricated structures (CON/SPAN or similar) without a floor should be coded with the appropriate arch element. Prefabricated structures with a floor should be coded with the appropriate culvert element. In either case, prefabricated structures that retain fill to support the roadway shall use the appropriate Wall Element instead of Assessment 9248 - Culvert End Treatment. The wall element shall be quantified and evaluated from end of wingwall to end of wingwall regardless of skew or construction joints located along length.
- Elements located above the fixed/moveable bearings should be coded using superstructure elements.

Navigating the Transition: Wisconsin DOT's Journey to SNBI Compliance

Questions?

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