

11TH ANNUAL INTERNATIONAL BRIDGE + STRUCTURE MANAGEMENT CONFERENCE

Inspection Mindset



Rebecca Nix
UDOT Bridge Management Engineer

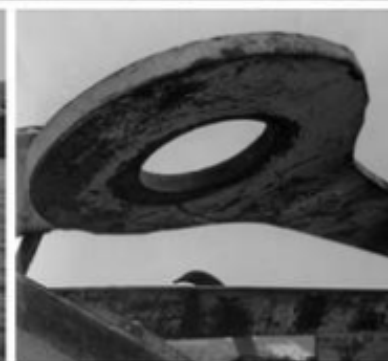
11TH ANNUAL IBSMC Overview



- Inspection Program History
- Why Change?
- Programmatic Modifications

11TH ANNUAL IBSMC NBIS History

- National Bridge Inspection Standards (NBIS) Introduced in 1971 following collapse of Silver Bridge



11TH ANNUAL IBSMC NBIS History

- Programmatic Changes
 - Identified funding shortfalls
 - Identified Federal Aid shortfalls



11TH ANNUAL IBSMC NBIS History

- Bridge Management System - PONTIS

Pontis 4.4 - You are currently logged in as PONTIS

File View Tools Window Help

Menu Bar

Desktop - Inspection

Inspection Layout Count Find... Select... Save... Select All Just Selected

Rows 1 to 19 of 528 Layout:

Bridge ID	Feature Intersected	Dist	Cnty	Own	Maint.
11 0009	CENTRAL IRRIGATION	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0011	WALKER CREEK	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0012	QUINT CANAL	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0013	BRUSH CANAL	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0017	SACRAMENTO RIVER	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0018	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0019	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0020	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0021	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0022	ANGELS SLOUGH	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0023	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0024	CAMPBELL SLOUGH	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0026	BIG BUTTE CREEK OVE	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0027	BIG BUTTE CREEK	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0028	GLENN-COLUSA CANAL	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0029	STONY CREEK	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0031	SACRAMENTO RIVER (	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0032	BIG BUTTE CREEK OVE	District 3	(11)GLENN	State Highway Agency	State Highway Agency
11 0033	BIG BUTTE CREEK OVE	District 3	(11)GLENN	State Highway Agency	State Highway Agency

Structure List

Toolbar

New Duplicate Element Open Past Translate Suff Rate Validate Transfer Data Check Out... Check In... Structure Create Remove Reports Retrieve

Status

Ready Pontis44 ASA Sample DB (pontis) N/A 07/06/2004 10:35:10

11TH ANNUAL IBSMC NBIS History

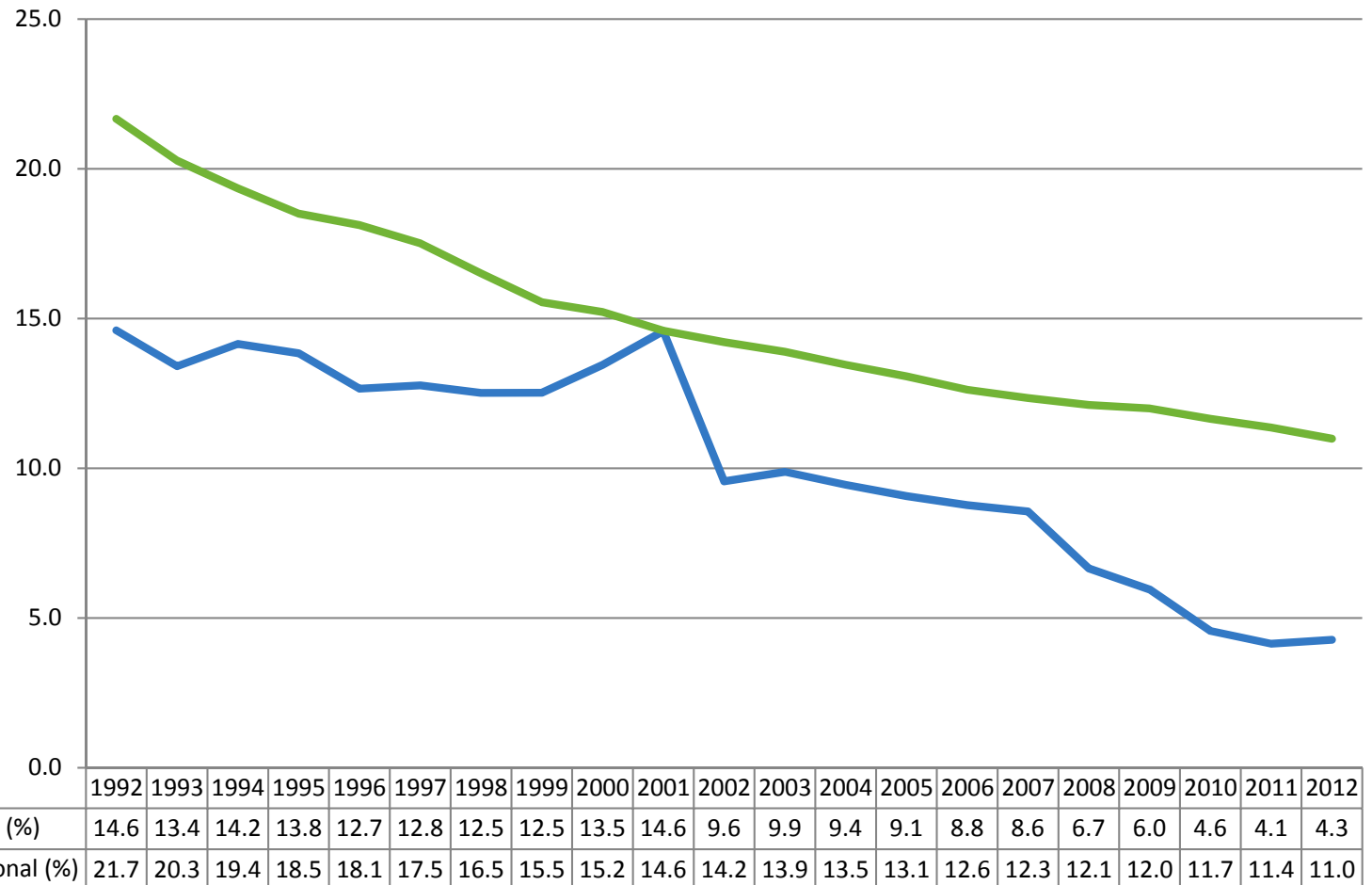


- 1995 – Preventative Maintenance eligible for Federal Bridge Funds
- Focus of funds on worst first approach – minimal preservation
- Can prioritize based on sufficiency rating and NBI ratings

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Focus Shift

- 2012 – All Structurally Deficient bridges in Utah programmed



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Focus Shift



- 2012 – All Structurally Deficient bridges in Utah programmed
- Dilemma – How to prioritize preservation activities
- What data is needed to prioritize?
 - Project history
 - Detailed condition data

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Are we collecting enough data with NBI ratings?



11TH ANNUAL IBSMC Bridge Joints

- Minor Element
- Not significant safety concern



11TH ANNUAL IBSMC Joint Failure Results

- 2007



11TH ANNUAL IBSMC AASHTO National Bridge Elements



- Not overall condition assessment
- Requires identifying extent and quantity of defects
- Additional documentation time is needed

Deck (058):

Superstructure (059):

Substructure (060):

Elem	Str. Unit	Env	Description	Quantity	Units	Qty. 1	Qty. 2	Qty. 3	Qty. 4	
12	101	Mod. (3)	Re Concrete Deck	<input type="text" value="9772.46"/>	sq.ft	<input type="text" value="0.000"/>	<input type="text" value="4997.761"/>	<input type="text" value="4774.701"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>
109	101	Low (2)	Pre Opn Conc Girder/Beam	<input type="text" value="1257.7"/>	ft	<input type="text" value="1186.70"/>	<input type="text" value="63.000"/>	<input type="text" value="8.000"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>
205	101	Mod. (3)	Re Conc Column	<input type="text" value="6"/>	each	<input type="text" value="0.000"/>	<input type="text" value="2.000"/>	<input type="text" value="4.000"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>
215	101	Low (2)	Re Conc Abutment	<input type="text" value="95"/>	ft	<input type="text" value="28.000"/>	<input type="text" value="67.000"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>
234	101	Low (2)	Re Conc Pier Cap	<input type="text" value="135"/>	ft	<input type="text" value="83.000"/>	<input type="text" value="50.000"/>	<input type="text" value="2.000"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>
310	101	Mod. (3)	Elastomeric Bearing	<input type="text" value="20"/>	each	<input type="text" value="0.000"/>	<input type="text" value="20.000"/>	<input type="text" value="0.000"/>	<input type="text" value="0.000"/>	<input type="button" value="x"/>

11TH ANNUAL IBSMC Defect Flags

- Not all defects are equal



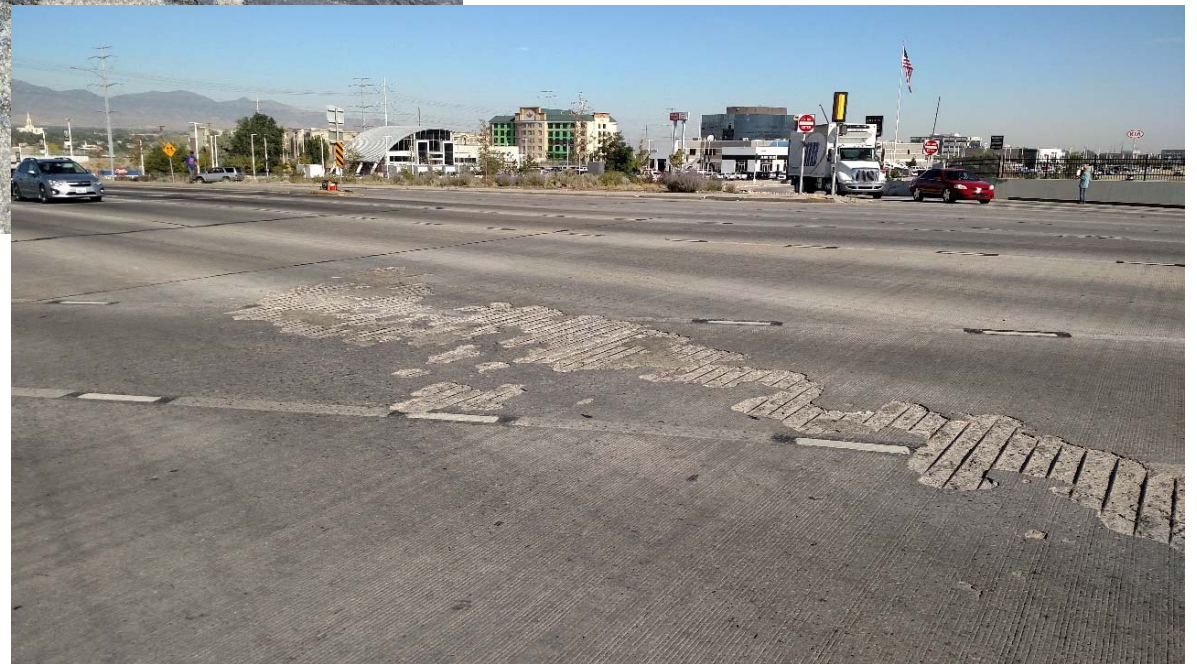
11TH ANNUAL IBSMC Defect Flags

- Not all defects are equal



11TH ANNUAL IBSMC Defect Flags

- Not all defects are equal



11TH ANNUAL IBSMC Bridge Health Index



- Additional data allows for a more comprehensive evaluation of condition for prioritization

$$H_e = \frac{\sum_s k_s q_s}{\sum_s q_s}$$

Where:

- H_e = health index of the individual element
- s = index of the condition state
- q_s = element quantity in s^{th} state
- k_s = health index coefficient corresponding to the s^{th} condition state for each element

And:

- Coefficient for the 4 condition states — $k_1 = \text{NBI Factor}$, $k_2 = 0.66$, $k_3 = 0.33$, $k_4 = 0$
- NBI conversion factors are determined from the following table, based on the most recent NBI value given to the deck, superstructure or substructure category:

11TH ANNUAL IBSMC Consistency



- Field Reviews
- Quality Control Audits
- Collaborative Peer Reviews
- Collaboration with Planning Engineers

11TH ANNUAL IBSMC Work Candidates



[Add New](#)
 Show All
 Show Open
 All Sources

▶ 1C 700_8671_246	Repair Waterproofing Membrane	1/1/1901		\$28,263.00	Completed	1	NA	2 / Type = F	9/7/2011	Waterproofing Membrane	✕
▶ 1C 700_8671_5491	Thin Bonded Polymer Removal	1/1/1901	-1	\$190.00	Completed	1	NA		9/7/2011	Thin Bonded Polymer Overlay Removal	✕
▶ 1C 700_8671_7027	Modify Expansion Joint	1/1/1901	-1	\$92,193.00	Completed	1	NA		9/7/2011	Expansion Joint Modification	✕
▶ 1C 700_3558_7337	Clean & Overcoat Steel	1/1/1901	-1	\$378,360.00	Completed	1	NA		3/28/2003	Cleaning and Overcoat Structural Steel	✕
▶ 1C 700_3558_2361	Clean & Overcoat Steel	1/1/1901	-1	\$265,725.00	Completed	1	NA		3/28/2003	Cleaning and Overcoat Structural Steel	✕

11TH ANNUAL IBSMC Work Candidates



[Add New](#) Show All Show Open

070714-52598675B33	Repair Beam / Girder Ends	7/7/2014	2017	Inspector Recommended	0	High	2 / Type = F	Repair Beam / Girder Ends	X
1D 672-IYZO-070714-69C74615CAA	Repair Abutment Backwall	7/7/2014	2017	Inspector Recommended	0	High	2 / Type = F	Abutment Backwall Repair	X
WorkCandidate1458	Update / Install Clearance Sign	7/7/2014	2017	Inspector Recommended	1	High	Maintenance Notes / Type = O	Update / Install Clearance Sign	X
1D 672-TFHM-072816-E7A63F7B82E	Repair/Replace/Reset Bearings	7/26/2016	2017	Inspector Recommended	0	High	2 / Type = F	Repair, Replace or Reset Bearings	X
1D 672-TFHM-072816-7F1FA0E0F21	Sweep Deck	7/26/2016	2016	Inspector Recommended	1	High	Maintenance Notes / Type = O	Sweep Deck	X

Type of Work

Candidate ID:

Structure Unit:

Action Type:

Action:

Date Recommended:

Priority:

Date Completed:

Target Year:

Assigned:

Work Assignment:

Status:

Source:

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UDOT Bridge Asset Management



Questions?