



Midwest Bridge Preservation Partnership

MINUTES IN RED – Monthly Teleconference

Tuesday, MAY 2nd, 2023

Business Meeting: 12:30 pm – 1:00 pm Central

Technical Session 1:00 – 2:00 pm Central

12:30 pm – Business Meeting.

1. Annual MWBPP Conference 2023 South Dakota

- a.) Next Monthly Planning Meeting – Wednesday May 17th at 1 pm.
- b.) Request for Presentations is live - <https://www.surveymonkey.com/r/SRWB36Q>
- c.) Due Date August 17th – going well, we have 20+ presentations already.
- d.) Promoting Local Bridge Owners to Attend Annual Meeting – already have 8 requests for the scholarships (10 authorized)!
- e.) If you won't be able to join the call, please send along any input you might have to Sarah Wilson, or Nancy Huether.
- f.) Full Scholarships (including Travel) – need to be considered and voted on. These are in addition to the 2 per State DOT, funded from normal dues. Normally each year, in accordance with the bylaws, the MWBPP will fund 4 or more additional State DOT members to attend. Additionally, this year, we have two local agency presenters requesting funding. Need to approve the number of Scholarships at the June Business Meeting, so that we can award the Scholarships at the July Business Mtg

2. July Teleconference –

- a.) Date has been changed to July 11th
- b.) Planning a Local Agency focus for the July monthly teleconference. Will promote TSP2 and have a topic of interest for / from a local agency.
- c.) Topics
 - Jason DeRuyver – “Bridge Maintenance Any Local Agency can Do.”
 - Get someone to do an overview on the FHWA Report – Prioritizing Preservation for Locally Owned Bridges - <https://www.fhwa.dot.gov/bridge/preservation/docs/hif22046.pdf>
- d.) Would request each state pass along the meeting information to their local bridge owners – Counties, Munis, Tollways... Draft flyer upcoming...
- e.) Limit is 250 people.

- 3. Our At Large Director Matt Keilson is no longer with Sika Group, and will need to be replaced. (Industry – Drew Storey / Nick Graziani)
- 4. Mike Brokaw is leaving Ohio DOT. Looking to fill the Secretary minutes.
- 5. National Meeting in 2024 – Salt Lake City Utah. September 10-13, 2024.
- 6. Other Business?

1:00 pm – Technical Session.

1. Roll Call **SEE ATTACHED LISTING**
2. Approval of Minutes - April 4th, 2023 **MINUTES APPROVED**
3. Bridge Preservation Expert Task Group Meeting – May 8 & 9
 - I will be attending and have been asked to provide input (from the Midwest perspective) on research needs, and also pocket guide or case study topics. They are looking for items that the BPETG can either do or advocate for others to do. Thoughts? **EMAIL Sarah Wilson, with any suggestions.**
4. **June 6th Meeting Topic** – Dr. Oguzhan Bayrak, Ph.D., P.E., FACI, FPCI Director Concrete Bridge Engineering Institute. Dr Bayrak will give an overview of the CBEI, and share some of the past issues, pitfalls, and built-in problems from the Bridge Deck Construction Inspection section.
5. **July Meeting** – Date change to July 11th. Please be prepared to share with any Local Agency Groups you are familiar with, a flyer will be prepared for sharing. **See draft flyer attached.**
6. **Technical Session** –
 - Phil Meinel (WisDOT) attended the SouthEast Bridge Preservation Partnership Annual Meeting and will review the meeting, and touch on the topics he found most interesting (<https://tsp2bridge.pavementpreservation.org/southeast-sebpp/2023-sebpp-atlanta-georgia/>) **See PDF of presentation attached.**
 - Mike Brokaw (OhioDOT) will discuss Ohio's use of Weathering Steel. **NOTES??**
7. **General Interest Items?**



Midwest Bridge Preservation Partnership

Agenda – Monthly Teleconference

Tuesday, July 11th, 2023

Technical Session 1:00 – 2:00 pm Central

DRAFT – Send Suggestions to Sarah Wilson

<https://global.gotomeeting.com/join/777203541>

Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.

Dial +1 (224) 501-3412

Access Code: 777-203-541

Audio PIN: Shown after joining the meeting

Meeting ID: 777-203-541

The Midwest Bridge Preservation Partnership is focusing on Local Bridge Maintenance for the Technical portion of our July teleconference. Bridges big and small all need the right attention at the right time, to maximize their life span. Whether your agency has only a few bridges, or a few hundred - please listen in for a discussion on what maintenance can be done with a limited budget.

1. Roll Call
2. Approval of Minutes - June 6th, 2023
3. Nancy Huether – TSP2 (AASHTO Preservation Management)– “How Local Agencies can Participate”
 - Local agency Working Group.
4. Jason DeRuyver – “Bridge Maintenance Any Local Agency can Do.”
5. Get Erik Thorkildsen/Richard Dunne from GPI to do an overview on the FHWA Report – Prioritizing Preservation for Locally Owned Bridges -
<https://www.fhwa.dot.gov/bridge/preservation/docs/hif22046.pdf>
6. Open Forum Discussions / Questions?

MWBPP Monthly Meeting Attendees

Summary

Meeting Date

May 2, 2023 12:10 PM CDT

Meeting Duration

115 minutes

Details

Name

Email Address

A Jones	
Aaron Kober	ACKober@modjeski.com
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Drew Andrade	
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Katrina Davidson	
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Lorella Angelini	
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Matthew Kurlle	mkurle@nd.gov
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Mike Stroia	michael.stroia@cmc.com
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Paul Denkler	
Philip Meinel	philip.meinel@dot.wi.gov
Raj Ailaney	raj.ailaney@dot.gov
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Sarah Wilson	sarah.wilson@illinois.gov
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Todd Shields	ncpp@msu.edu
Walter Peters	WPETERS@ODOT.ORG
paul jensen	pauljensenllc@gmail.com

SEBPP 2023

Highlights from a WI perspective

Philip Meinel
May 2, 2023

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SESSION 1 – Welcome / Superstructure Preservation (International Ballroom F)	Moderator: Tim Sherrill, NCDOT
Opening Remarks & Welcome by Georgia DOT	Robbie Koirala, GDOT Donn P. Digamon, GDOT State Bridge Engineer Andrew Heath, GDOT Deputy Chief Engineer Nancy Huether, NCPP @ MSU
Preservation of the Sidney Lanier Cable Stayed Bridge	Michael Craig, & Hatem Seliem, WSP & Aaron Larosche, Pivot Engineers
Preservation of the I-26 Green River Bridge in Western North Carolina	John Sloan, AECOM
Case Study of the Rehabilitation and Preservation of Two Ohio River Cable Stay Bridges	Dallas Montgomery & Ed Cinadr, Burgess & Niple, Inc.

2



I-26 Green River Bridges

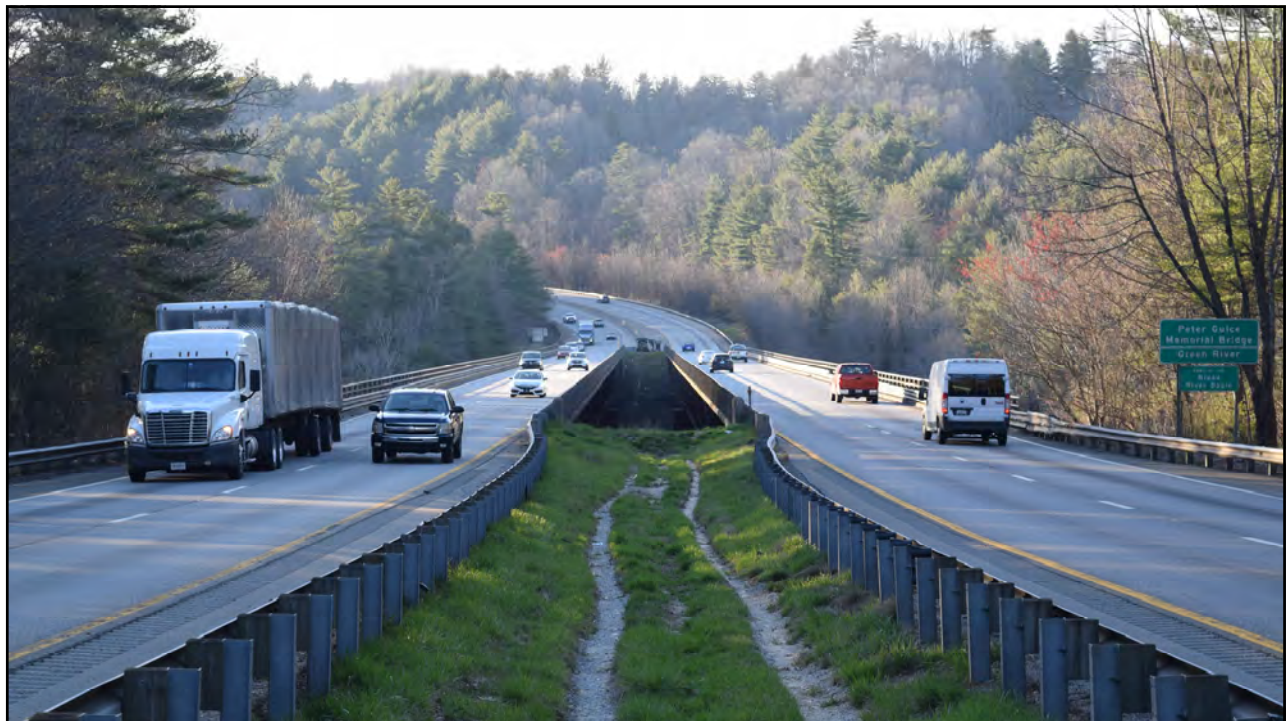
Southeast Bridge Preservation Partnership
April, 2023

John Sloan, PE

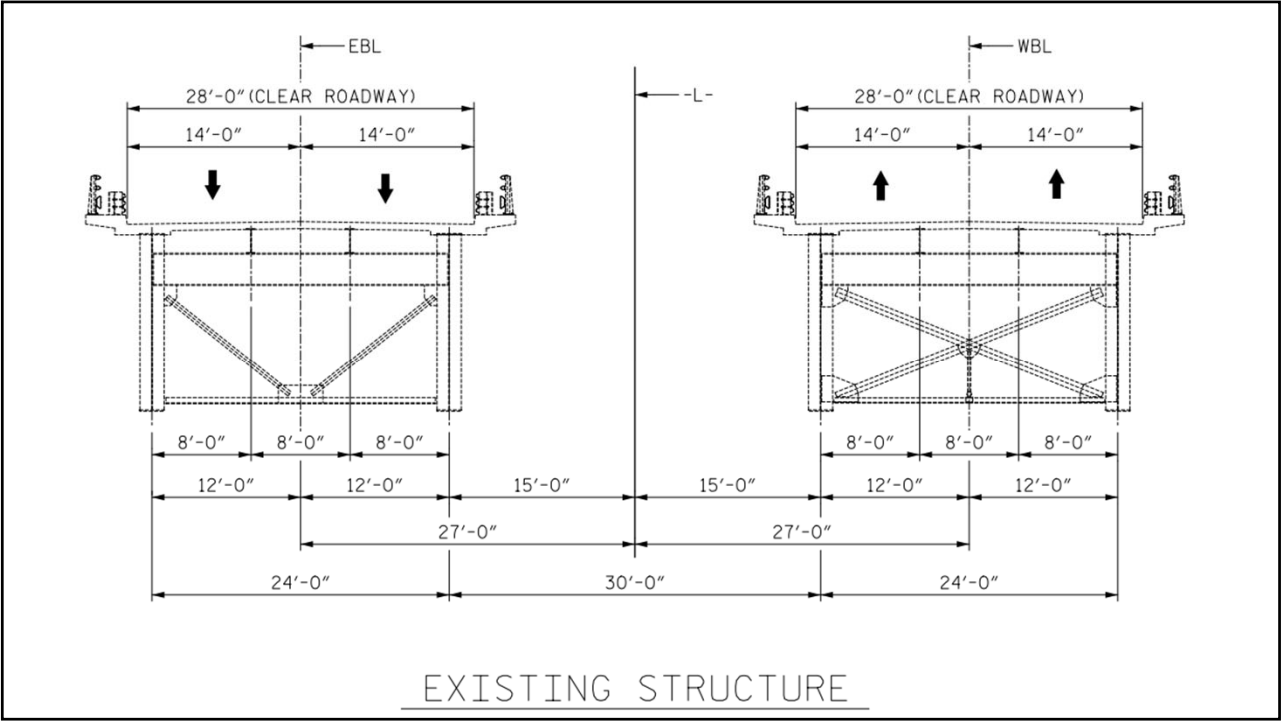
Delivering a better world



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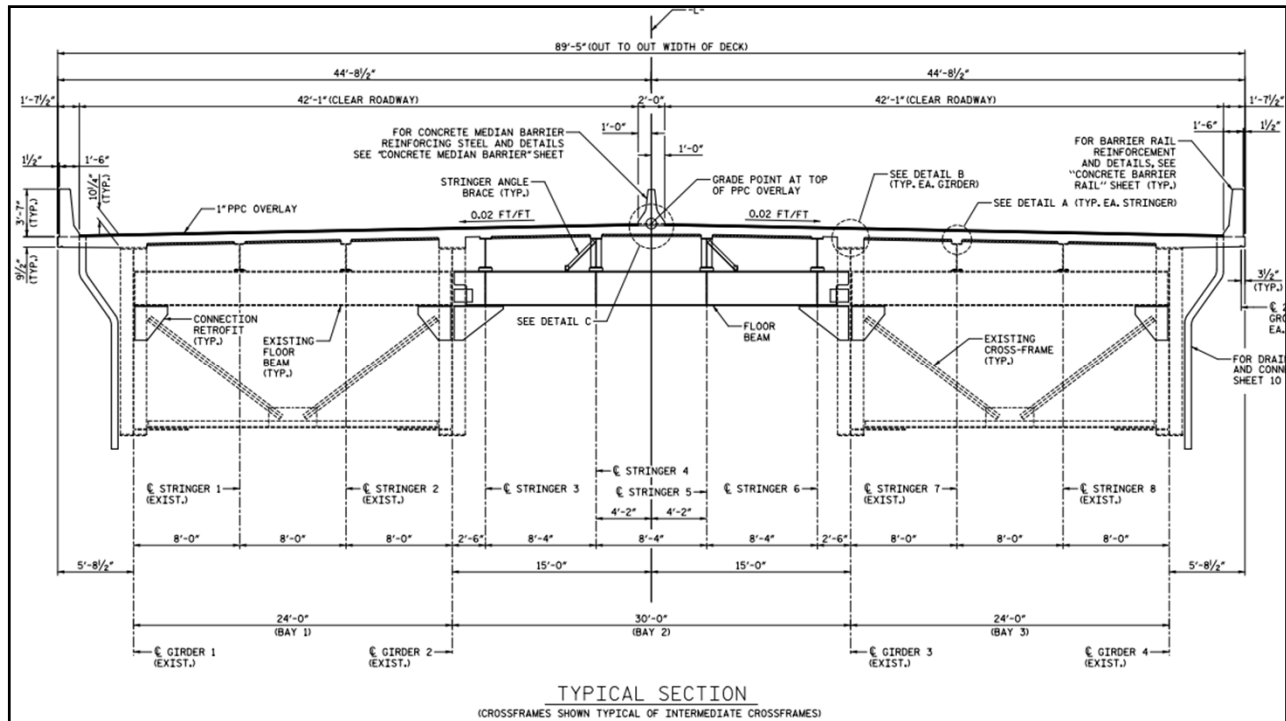
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SESSION 2 – Challenges with Preservation of Standard Bridges (Ballroom F)	Moderator: Steven Austin, TxDOT
Identifying and Addressing Deteriorated Steel and Timber Piling	Graham Bettis, TxDOT
Poor Bridge to Good Culvert in 30 Days or Less	Kevin Weston, ARDOT
The Virginia Small Bridge Program	Glenn McAninch, VDOT
Panel Session: Prioritizing Preservation of Standard Bridges	Panel Moderator: Steven Austin, TxDOT

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Identifying and Addressing Deteriorated Steel and Timber Piling

Graham Bettis – Texas State Bridge Engineer

May 2, 2023

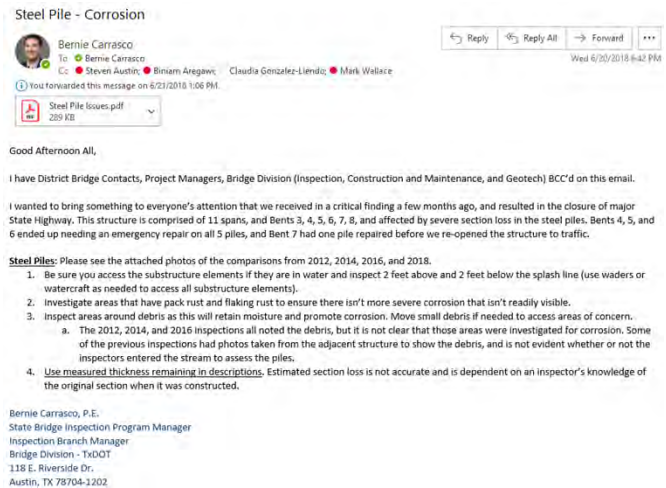
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Step 1: Raise Awareness and Reset Expectations for Inspection

June 18, 2018 email from Statewide Bridge Inspection Program Manager.

Must access all substructure elements using waders, watercraft, or whatever other means necessary (sounds obvious, I know).

Measure and report remaining section; stop estimating section loss.



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Step 2: Statewide Bulletin from State Bridge Engineer

July 6, 2018 Bulletin emphasized and strengthened previous message from Bridge Inspection Program Manager.

Included information on two recent emergency closures, including buckled piling.



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Step 2: Statewide Bulletin from State Bridge Engineer



Clarified expectations of Inspectors, with several significant additions:

- Add requirement for underwater inspection if any substructure element is submerged in more than 4 feet of water.
- Any debris preventing up-close inspection must be reported as an Urgent Finding.
- Evaluate full length of all piling, from cap to 2 feet minimum below splash zone.
- Report measured section remaining, not estimated section loss (which was often being reported as "100% section loss"). Report specific location of deficiency.

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Measuring vs. Estimating ~~Section Loss~~ Remaining Section

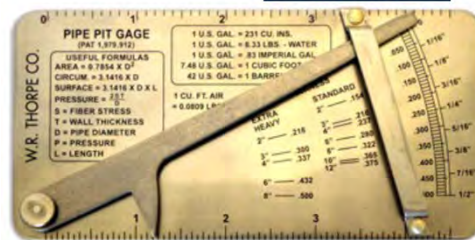


Outside caliper



D-meter plus couplant

Pit guage

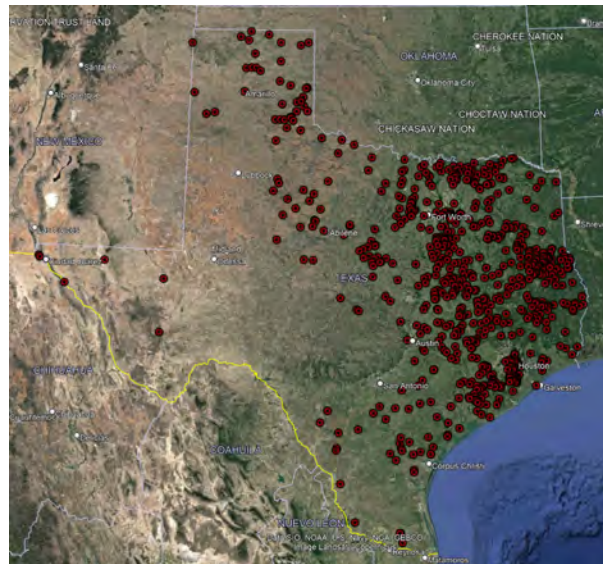


Dial caliper

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Steel and Timber Piling with Substructure Condition Rating ≤ 5



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Step 4: Bridge Folder Review



Next step was to review the Bridge Inspection Reports and other available information for all 863 bridges.

Goal was to determine how severe the deterioration really was, what repairs should be undertaken, and what other actions may be warranted (e.g. closure).

Categorizing would allow us to address the most serious conditions immediately, while developing a program to tackle the others.



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Step 4: Bridge Folder Review – As of November 2018



	Off-System	On-System	Sum
Critical Finding	21	3	24
Repair Needed	115	42	157
Recommended for UW Inspection (depth >=4ft)	6	0	6
Follow Up Field Assessment after folder review	159	92	251
Bridges Recommended for Closure	4	0	4
Recommended lowering Condition Ratings	9	0	9
Total No. Bridges Assessed	629	234	863

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Step 5: Form Working Group and Get to It!



Goal was to use the information that had been gathered and move into widespread repair implementation.

Met monthly to kick things off, then moved to quarterly.

- Working Group consisted of:
 - Division Leadership
 - Bridge Program Management (programming, data, and money)
 - Bridge Inspection Program Manager
 - Bridge Preservation Engineers (boots on the ground, repair expertise)



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Wait, wasn't this supposed to be about steel AND timber piling?

Our approach to addressing deteriorated timber piling is much simpler.

Replace the Bridge!

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Resources - Working Drawings

The screenshot displays the CROSSROADS Oracle PeopleSoft interface. The main navigation bar includes links for Apps, Employee Resources, Safety, Districts & Divisions, Administration, and Contacts. The left sidebar lists various BRG (Bridge Repair Group) resources, including BRG Home, BRG Leadership, BRG Org Chart, BRG Phone Directory, Business Operations, Bridge Design, Bridge Management, Field Operations, and BRG on TxDOT.gov. The main content area is titled 'Field Operations' and contains sections for 'Reporting Bridge Emergencies', 'Seismic Activity Rapid Response Plan', and 'Construction and Maintenance'. Under 'Construction and Maintenance', there is a list of links: 'Construction and Maintenance Branch Coverage', 'Lead-Based Paint Issues in Removal of Existing Structures', 'Welding Certification Requirements', 'Bridge Construction Tips', 'Construction and Materials Tips', and 'Working Drawings'. The 'Working Drawings' link is circled in red. A red arrow points from the 'Working Drawings' link to a detailed view of the 'Working Drawings' section, which lists several documents: 'Pile Repair Detail (.pdf)', 'Pile Repair Detail (.dgn)', 'Steel Deck Encasement Detail (.pdf)', 'Drill Shaft Encasement Detail (.dgn)', 'Strand Splicing Repair (.pdf)', and 'Strand Splicing Repair (.dgn)'. The 'Pile Repair Detail (.pdf)' and 'Pile Repair Detail (.dgn)' links are also circled in red.

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Current Status



We've performed an in-depth evaluation of our pile conditions at a two year interval since the effort began in 2018.

BRG is continuing to support districts with field assessments to ensure confidence in bridge inspection data regarding steel and timber pile condition.

Continually tracking bridges and working with districts and local government to increase awareness.

Moving to integrate more information regarding programming into the Bridge Inspection Database to move away from manual tracking and automate reporting.

Since 2020 this initiative has led to a large number of repaired and replaced bridges:

Action	ON-SYSTEM	OFF-SYSTEM
Repaired	80	46
Replaced	38	231

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Takeaways



One size does not fit all – think critically about options.

Concrete encasement is a highly effective approach, typically at a cost much lower than other bridge rehabilitation work.

Change orders are common and not to be feared.

Inspection, Inspection, Inspection!

This is an on-going effort that requires championing at the statewide level.



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Poor Bridge to Good Culvert in 30 days or less

Arkansas Department of Transportation

Kevin Weston – Staff Heavy Bridge Maintenance Engineer

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In House Bridge Building Crew

2 Solutions for growing needs

Channel Beam Replacements

Replace Bridge with Box Culvert

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Results

Statistics on money in House Crew

- 2018 ARDOT Bridge Replacement Cost = \$185/SF (Contract)
- 2023 ARDOT Bridge Replacement Cost = \$500/SF (Contract)
 - 3–4-year timeframe from concept to construction
 - >1 year construction timeframe
- 2023 ARDOT In House Bridge Replacement Cost = \$175/SF
 - 6 month or less timeframe from concept to construction
 - 1 month construction timeframe

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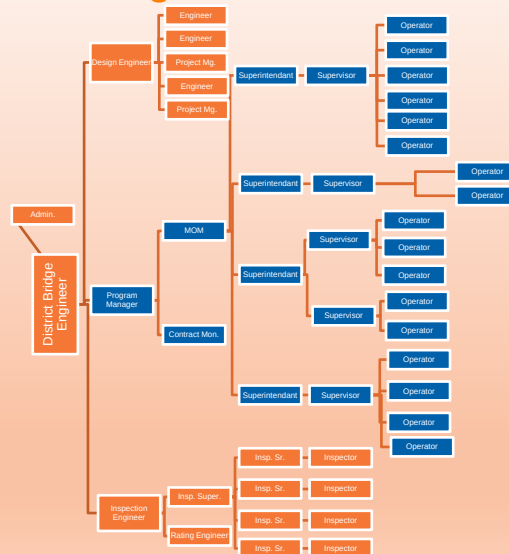
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graph TD; A[District Bridge Engineer] --> B[Admin.]; A --> C[Design Engineer]; A --> D[Inspection Engineer]; C --> E[Engineer]; C --> F[Engineer]; E --> G[Drafter]; F --> H[Drafter]; D --> I[Superintendent]; D --> J[Insp. Sr.]; D --> K[Insp. Sr.]; D --> L[Insp. Sr.]; I --> M[Supervisor]; J --> N[Inspector]; K --> O[Inspector]; L --> P[Inspector]; M --> Q[Operator]; M --> R[Operator]; M --> S[Operator];
```

The organizational chart for the District Bridge Engineer is structured as follows:

- District Bridge Engineer** (Top Level)
 - Admin.** (Subordinate)
 - Design Engineer** (Subordinate)
 - Engineer** (Subordinate)
 - Drafter** (Subordinate)
 - Engineer** (Subordinate)
 - Drafter** (Subordinate)
 - Inspection Engineer** (Subordinate)
 - Superintendent** (Subordinate)
 - Supervisor** (Subordinate)
 - Operator** (Subordinate)
 - Operator** (Subordinate)
 - Operator** (Subordinate)
 - Insp. Sr.** (Subordinate)
 - Inspector** (Subordinate)
 - Insp. Sr.** (Subordinate)
 - Inspector** (Subordinate)
 - Insp. Sr.** (Subordinate)
 - Inspector** (Subordinate)

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- State Wide Reorganization June 2010
- Prior to 2010 there were 3 dedicated Bridge Crews.
- Statewide 38 Crews and 260 employees.
- Culpeper Increased from 1 to 4 Bridge Crews.
- Bridge maintenance went from 5 to 29 employees.



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State Force Small Bridge Program

The Small Bridge Program:

- Limited to \$700,000.00 Construction per project.
- Bridge Replacements
- Superstructure replacements.
- Emergency Response.
- Bridge repairs.
- Ordinary maintenance.



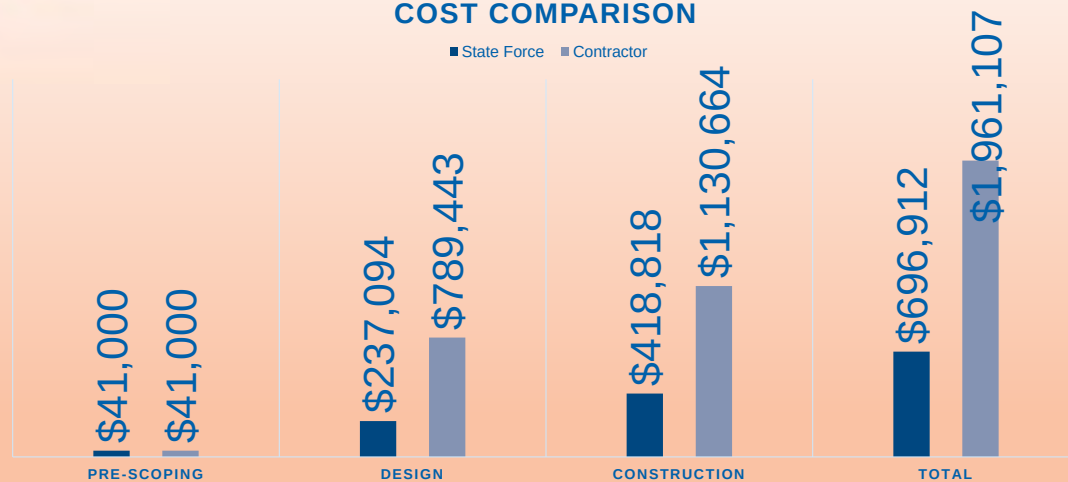
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Rte. 603(State Force) Compared to Rte. 637 Ivy Creek (Construction Contract)

COST COMPARISON

■ State Force ■ Contractor



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State Force Accomplishments

	Structures Replaced	Superstructure Replacements	Preventative Maintenance
FY22	86	91	4029
FY21	94	102	3121
FY20	114	119	4186
FY19	128	199	3798
FY18	87	184	4136
FY17	52	109	3391

Totals for the last 6 years

- 516 new structures
- 804 new superstructure
- Maintenance performed on 22661 structures

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SESSION 3 – Bridge Inspection & Innovative Evaluation Technology (International Ballroom F)	Moderator: Haylye Brown, LaDOTD
The New ARDOT Dive Inspection Team	Kevin Weston, ARDOT
Underwater Inspections – Imaging to Monitor Scour and Scour Countermeasures	Michael Dukes, Consor Engineers, LLC
Overview of a Performance-Based Design and Implementation of an SHM System on a Complex / Signature Bridge for a DOT	Nathaniel Dubbs, Bridge Diagnostics, Inc.
Use Cases for Emerging Technologies	Drew Appler, Burgess & Niple, Inc.

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The New ARDOT Dive Inspection Team

Arkansas Department of Transportation
Kevin Weston – Staff Heavy Bridge Maintenance Engineer

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Background information

Research on how to meet requirements for Underwater Inspection

- Be evaluated by medical professional and volunteer for diving
- CPR and First Aid Trained
- Trained in diving operations
- FHWA NHI Underwater Inspection Certification
- Written Procedures for reducing risk
 - In House team limited to low-risk diving
- 4 Person Dive Teams
 - Consisting of at least 1 engineer per team
 - HBM inspectors



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Background information

Restrictions for reduced risk

- Dive no deeper than 25 ft
- Not dive currents faster than one knot
- Not dive in heavy debris areas, areas with hazardous material in the water near the bridge, in areas with active construction, or in confined spaces
- Not be working on submerged bridge components, only inspecting
- Not complete a dive if feeling uncomfortable or unsafe



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The Inspection Process

Underwater Inspection

- Typically, can inspect 2 bridges/day depending on proximity
- Typically, 2 divers/inspectors in the water.
- While divers suit up and check equipment, other inspectors take drone photos and start measurements for channel cross section
- Team will identify and address safety hazards through risk assessment
- Team members will do communications check and safety meeting prior to entering the water



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Outcome and Lessons Learned

Cost Analysis and Benefits

- Roughly half the cost to ARDOT to do a similar sized bridge with in-house forces vs. consultant
 - Includes salaries, benefits, equipment, etc.
 - 75% of Arkansas Dives can be done with in house crew
- Local knowledge and coordination with top side inspectors
- The inspectors/engineers truly enjoy the diving aspect of inspection
- In House Team can QA Consultants



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SESSION 4.1: Deck Preservation (Ballroom F)	Moderator: Dick Dunne, GPI
Rapid Rehabilitation of the SR-155 Bridge over the Cumberland River	Blake Liberati, Hydro-Technologies
Avoiding Pitfalls on Bridge Deck Restoration Projects	Marcy Ream, FPT Infrastructure
LMC Overlays in Georgia	Edward Haden, IVS Hydro, Inc. & Lyle Austin, Comanche Construction of Georgia, LLC
Deck Preservation WG Update & Construction Quality WG Update	Steven Austin, TxDOT & Tim Sherrill, NCDOT
Panel Session: State Challenges Prioritizing Deck Overlays & Other Preservation Actions	Panel Moderator: Dick Dunne, GPI
Panel Members	
Tim Sherrill, NCDOT Andy Nanneman, ARDOT Steven Austin, TxDOT	

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Panel Session: State Challenges Prioritizing Deck Overlays & Other Preservation Actions	Panel Moderator: Dick Dunne, GPI
Panel Members	
Tim Sherrill, NCDOT	Andy Nanneman, ARDOT Steven Austin, TxDOT

Highlights

- Difficult to coordinate with roadway, especially on major corridors
 - Let two contracts (break out structure work)
 - Traffic accommodations create less than ideal treatment or timing
 - Night work
 - Scale back scope
- Different entities responsible for different levels of treatments (or bucketing of funds artificially favoring one treatment type over another)
 - Central bridge office versus District/Regions/Locals
 - VA prioritization formula limited by NBI of 5 at funding level (side conversation)
- AR said about 16-18% of bridge funding goes to preservation

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SESSION 5.1: Performance Measures & Asset Management (Ballroom F)	Moderator: Graham Bettis, TxDOT
Managing Bridge Preservation and Maintenance Actions – Observations from Implementation of Maintenance Module	Steven Austin, TxDOT
The Impact of Bridge Deck Overlay Activities Using NBI Data	Casey Rafter, Kwik Bond Polymers, LLC & Nick Pierce, NCDOT
Midwest Bridge Element Deterioration TPF-5(432)	Philip Meinel, WisDOT
Dynamic Assessment of Fred Hartman Using OMA – Cable Stay	Ozan Celik, Geocomp
20-01 — Successful Approaches to Utilizing Bridge Management Systems for Strategic Decision Making in Asset Management Plans	Felix Padilla, FDOT

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Managing Bridge Preservation and Maintenance Actions

Observations from Implementation of Maintenance Module

Steven Austin, P.E.
Field Operations Section Director, TxDOT Bridge Division

April 5, 2023

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Maintenance Module Process – Step 1

- Inspector enters defect and recommendation
- Each entry includes:
 - Bridge identifying information
 - Description of issue and recommendation
 - Level of urgency
 - At least one picture documenting the deficiency found
- After the inspector section is completed, it moves to “District Bridge Review”

Bridge Inspection Follow-Up Action

Initial Finding Information

Location Information
 Bridge ID# 121020038912089 Latitude 29.69412956 Longitude -95.02799498 FUA ID 558786
 Facility Carried SH 146 NB Location 0.6 MI N OF SH 225
 Feature Crossed HOUSTON SHIP CHANNEL County 102-HARRIS

Ownership/Responsibility
 District HOU Area Office Southeast Harris Maintenance Section 06
 System Designation 1 Control - Section 0389 - 12
 Bridge Owner Precinct

Maintenance Information
 Inspection Date 02/05/2022 Critical Finding? N
 Bridge Component Superstructure Repair Category Repair Bearing
 Other Rec Type * Level 3 Previously Recommended? Y
* LEVEL 1 - 30 DAYS | LEVEL 2 - 6 MONTHS | LEVEL 3 - 24 MONTHS | LEVEL 4 - NO REQ'D TIMEFRAME

Description of Issue & Follow Up Action Recommendation
 The bearing bolts of both Girders A and B at the South and North Towers have rose budding and section loss. Concrete bearing pedestal covers have delaminations and spalls.
 Recommendation: Replace bearing anchor bolts and repair delaminated and spalled bearing pedestal concrete covers for both girders at the South and North Towers.

District Bridge Office Comments (REQUIRED WHEN CHANGING REC TYPE) 1

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Maintenance Module Process



- We use four priority levels to classify the severity of the defect:
 - Level 1 – The more critical items that require action within 30 days
 - Level 2 – Urgent items that require action within 6 months
 - Level 3 – Routine/Typical items that need action within 24 months
 - Level 4 – Non safety related items that do not have a definitive deadline

Maintenance Information	
Inspection Date: 12/06/2022	Critical Finding?: N
Bridge Component: Substructure	Repair Category: Perform Concrete Repair to Spalls (Horizontal, Vertical, Overhead)
Other:	Rec Type: Level 4
	Previously Recommended?: Y
* LEVEL 1 - 30 DAYS LEVEL 2 - 6 MONTHS LEVEL 3 - 24 MONTHS LEVEL 4 - NO REQ'D TIMEFRAME	
Description of Issue & Follow Up Action Recommendation	
East end of bent cap 9 has impact spall with exposed rebar.	
Clean and patch the spall with exposed rebar at east end of bent cap 9.	

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Maintenance Module Process – Step 2 – District Bridge Review



- District reviews the FUA item and develops plan for resolution
- Parties involved in the process can include:
 - District Bridge Office
 - Area Office – Owner of the Structure
 - Maintenance Office – Responsible for maintenance in that area
 - District Maintenance Engineer
 - Director of Transportation, Planning, and Design
 - Bridge Maintenance Crew (if available)

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Maintenance Module Process – Step 3 – Performing the Work



- The work is completed in the field and documented on the FUA form
- At least one picture is required to document the completion of the work
- The appropriate person from the District will enter a description of the work performed, by whom, and date the work was completed
- The FUA item is then moved through the workflow to “District Bridge Closeout”

District Area or Assigned Maintenance Office Comments or Resolution ²

East end of bent cap 9 has been cleaned and patched.

Comments By ² Date ²

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Maintenance Module Process – Step 4 – Verification & Closeout



- District Bridge Office reviews completed work and ensure that the work required was performed and that the necessary information was entered uploaded to the system.
- If the documentation is complete, District Bridge Office will pass the item through to the Completed stage which closes out the recommendation

Follow-up Action Resolution

Work to be Completed Via: +

District Proposed Funding Source: +

Project Status: +

District Estimated Letting +

Date: +

CSJ / WO / Project ID: +

Additional Comments if Necessary

East end of Bent cap # 9 cleaned and patched.

Action Taken 1

Verified By 1

Date Verified * * This will be the official Date Resolved

+ Optional Fields

- Documentation of the completed repairs is retained in the system.

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Maintenance Module – Other Improvements to Help Tracking



- Details for planned work to be performed
- Details for planned contract and letting date
- Fields for comments

Follow-up Action Resolution

Work to be Completed Via: Contract Forces	Action Taken
District Proposed Funding Source: CAT 1 - RMC	Verified By
Project Status: Let	Date Verified * 11/16/2022 * This will be the official Date Resolved
District Estimated Letting Date: 11/16/2022	- Optional Fields
CSJ / WO / Project ID: 6411-77-001	
Additional Comments if Necessary	

- Single source for tracking of recommendations made for off-system bridges

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Maintenance Module – Path to Success

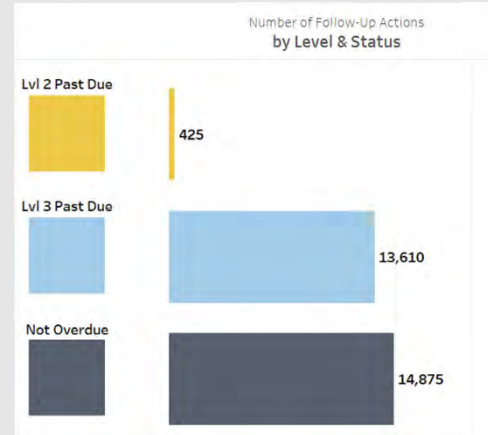


- Top-notch training with a detailed user guide with step-by-step instructions
- Shorter detail guides were created for the specific disciplines that are working through the system. This limits the amount of time needed “thumbing through” the entire user guide.
- Recorded training session was placed on the TxDOT YouTube page for reference at any time
- Continual training and support for new staff

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Maintenance Module – Results

- The entire State is on board with the program
 - Documentation has drastically increased
 - Follow-through has significantly increased
- With the Maintenance Module, TxDOT is able to
 - Quantify the magnitude of work recommended
 - Prioritize actions and group similar work types for programming
 - Identify which districts are prioritizing bridge maintenance (and which are not)



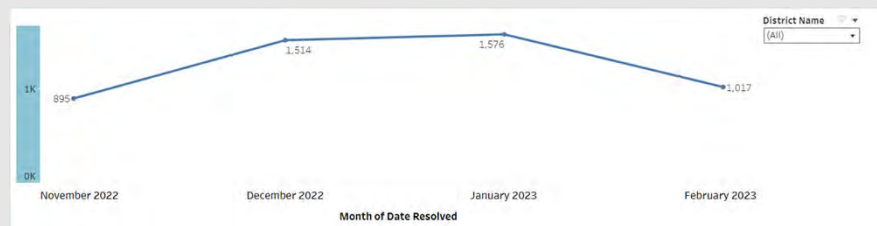
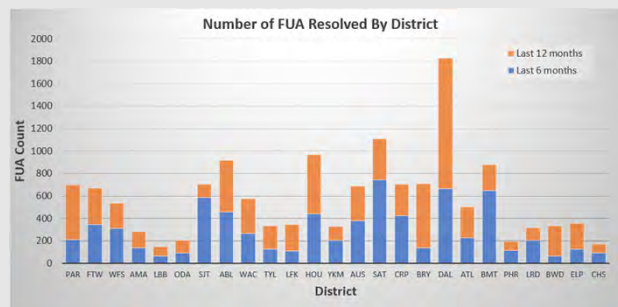
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Monthly Reporting and District Competition!



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Maintenance Module – Results



- More districts are moving to add some bridge repair capabilities



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Maintenance Module – Results



- The backlog of unaddressed priority level 3 recommendations has made it difficult to catch up
- Increasingly more difficult to show progress after the low-hanging fruit are addressed. The more complicated issues take longer to resolve
- The numbers don't lie...
 - CAUTION! With emphasis from leadership, there can be a desire to show improvement before something is completely resolved.
- With more attention on bridge maintenance there is an increased focus on more programmatic maintenance and true preservation actions

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The Impact of Bridge Deck Overlay Activities Using NBI Data

Nicholas Pierce – NCDOT
Casey Rafter – Kwik Bond Polymers, LLC

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Why investigate PPC wearing surfaces in North Carolina?

- PPC is a ghost in the NBI
 - No current 108A Wearing Surface code for PPC or EPC (LMC has Code 3)
 - Bridges with PPC overlays often carry a random 108A code
 - As PPC usage goes up, statewide data quality may go down
- Usage by NCDOT starting 2016
 - Element level data available for all installed PPC overlays

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Specifications for the National Bridge Inventory (SNBI)

- New PPC overlay code added
- Overlays of all types will migrate

Subsection: 2.1 – Span Material and Type

Data Item: Wearing Surfaces

C07 – Concrete – Polyester



*Specifications
for the National
Bridge Inventory*



Office of Bridges and Structures

Publication No. FHWA-HSP-22-017

March 2022

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Potential adjustments to NCDOT's recording process:

- Use BME #510 Wearing Surface element on all bridges having separate wearing surface installed without respect to FG of deck.
→ To track overlays by install date vs contract award
- Consider use of Agency Defined Element (ADE)
→ To track different overlays by type in BMS
- Update inspection policy and triggers to mitigate anomalies
→ To ensure [Bridge Condition ↑ = NBI ratings ↑]
- Training and more communication!
→ Construction Inspectors, NBI Inspectors, SI&A and others

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SESSION 6 – National Initiatives (Ballroom F)	Moderator: Aaron Immel, Volkert
AASHTO COBS T9-Bridge Preservation Committee Update	Haylie Brown, LaDOTD
FHWA Bridge Preservation Expert Task Group (BPETG)	Nancy Huether, NCPP
AASHTO MaC Bridge Technical Working Group (TWG)	Andy Doyle, GDOT
Panel Discussion: Working Groups	Moderator: Nancy Huether, NCPP
Panel Members: Felix Padilla, FDOT (Bridge Preservation BMS) Mario Baggio, Alchemco (Innovative Technology Demonstrations) Todd Shields, NCPP (Local Agency Outreach) Tony Serdenes, AMPP & GPI (Bridge Preservation Coatings) Stephanie Doolittle, LADOTD (SEBPP BIPM)	

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SESSION 7– Stuff Too Good to Miss 😊 (Ballroom F)	Moderator: Robbie Koirala, GDOT
Where Did NACE and SSPC Go?	Tony Serdenes, GPI
Repaint of the Old 7 Mile Bridge	Paul Vinik, GPI & Pablo Orozco, FDOT
Novel Approaches Towards Monitoring of Scour Activity and its Effects on Structure	Nathaniel Dubbs, Bridge Diagnostics, Inc.
TxDOT's Load Testing Toolbox	Steven Austin, TxDOT

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AMPP: Association for Materials Protection and Performance

Where did NACE and SSPC Go?
Southeastern Bridge Preservation Partnership Conference

Presented by: Tony Serdenes, PCS Corrosion Protection Pursuits Leader & AMPP Technical Committee "Transportation" Chair
Date: April 6, 2023

GPI Engineering | Design | Planning | Construction Management

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Standards Program Activity

- **All existing standards bearing the NACE or SSPC name will continue to be used without change**
- **New standards developed since the merger bear the AMPP name**

GPI *The Global Leaders in Materials Protection and Performance* 64

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What does this mean for our industry?

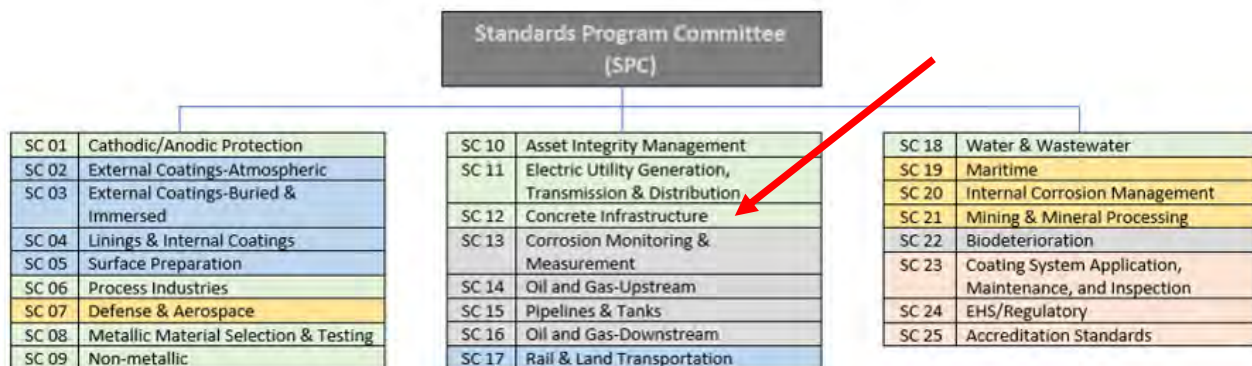
- Standards presently used in our specifications will not change. SSPC SP 10 Near White Blast, SSPC PA 2 for DFTs, SSPC SP 2 & 3 (Hand & Power Tool)
- Guides will remain the same. SSPC Guide 6 Containment, SSPC 12 Lighting, SSPC Vis Guides (Dry Abrasive blasting)
- Certifications like C-3 Lead, BCI, CIP Levels 1 – 3 (*Though they have changed, inspectors can still access their AMPP certification for each level)

GPI

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AMPP Standards Committees



GPI

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TxDOT's Load Testing Toolbox

Steven Austin, P.E.
Field Operations Section Director, TxDOT Bridge Division

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General Uses of Load Testing Results



- “Increase” Live Load Carrying Capacity of a Bridge
 - Supplement traditional load rating calculations
 - Take advantage of unintended composite action, unintended continuity, secondary members
- When current analysis can not provide a satisfactory answer to **performance questions**
- Verifying Bridge Performance
 - Material/structural damage
 - Bridge without plans
 - Repair/Strengthening evaluation
 - Fatigue Evaluations

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Types of Load Testing



- Generally, two types of load tests:

Diagnostic Load Test

- Test truck load is normally less than the calculated capacity
- Bridge plans exist
- Can be used to calibrate analytical or numerical model of the bridge

Proof Load Test

- To establish maximum safe load carrying capacity
- Loads are applied incrementally
- Test is stopped if any non-linear behavior is observed during the test

Load Testing at TxDOT



- Bridge load testing is becoming more common and being used as an important tool for bridge evaluation
- TxDOT has historically performed load tests through consultant contracts
- Recently TxDOT initiated effort to build in-house load testing capability through:
 - TxDOT's research program
 - Acquiring load testing equipment
 - Growing in-house expertise
 - Hiring

Digital Image Correlation



- TxDOT Research Project O-6950 - University of Texas at San Antonio
- 2017 - 2020
- Project validated the concept and developed hardware and software to measure deflections (to 1/1000 of an inch) and strains using high resolution cameras
- Project cost \$419,432

No.	Item Description	
1	High Resolution Camera	2
2	Targets (Big, Medium and Small)	40
3	Calibration Plates	1
4	Data Collection and Processing Software	1
5	Field Laptop	1

Accessories: Mounting Pole, Gorilla Tapes, Power Banks, Measuring Tapes, Laser, Camera Tripod, Etc.

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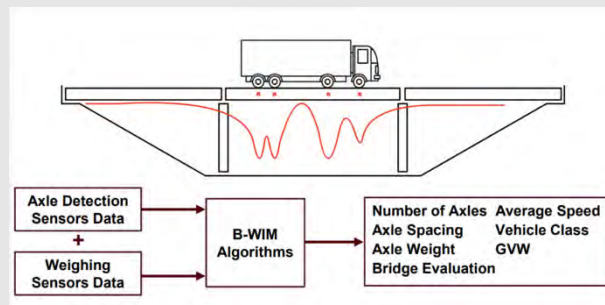
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Bridge Weigh-In-Motion



- TxDOT Research Project O-7038 – Texas Transportation Institute
- 2019 - 2022
- Validate concept and equipment capable of determining gross vehicle weights and axle weights
- Project cost \$414,611



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Bridge Weigh-In-Motion



Truck Information	Qualitative Accuracies	Validation Study Results (Percent Differences)
Axles (number and spacing)	High	1% - 6%
Speed	High	1% - 4%
Axle weight	Moderate	2% - 23%
Gross weight	High	2% - 13%
Classification	High	<5%



Advantages

- High accuracy
- Consistent weight measurements
- Many commercial systems

- High accuracy
- Consistent weight measurements
- Portable/cost-effective

- High accuracy (axle detection and GVW)
- Durable/cost-effective
- Reusable
- Bridge evaluation

Challenges

- High installation cost
- High maintenance
- Limited to certain highways

- Dynamic effects can influence results
- Less durable

- Lower axle weight accuracy
- Limited expertise
- Only measures trucks (Class 4-13)

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Traditional Instrumentation



- Strain measurement system for diagnostic load testing
- \$40,000 invested in equipment

No.	Equipment Description	Quantity
1	STS Wireless Nodes with 4 Channels with Intelleducer Connectors	4
2	STS Wireless Base Station	1
3	STS350 Resistance Based Full Bridge Strain Gauge	18
4	Extension Arm for Concrete Application	14
5	STS Live Data Acquisition Software for Viewing and Storing Data During a Load Test.	1
6	Truck Weigh Scales	2

Accessories: Sensor Mounting Tab, Specialized Glue, Grinders, Acetone, Laser Distance Meter, Chalk Line, Spray Paint, Etc.

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Example: Load Testing Using Strain Gauges

- Reinforced concrete T-Beam
- Built in 1932, widened in 1967
- Posted for load



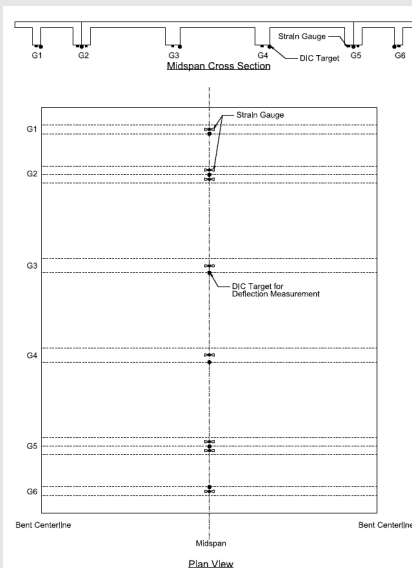
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Load Testing Using Strain Gauges



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Load Testing Using Strain Gauges



- BDI ST350 strain gauge was used with extension arms
- BDI STS4 wireless nodes
- STS wireless base station for data acquisition



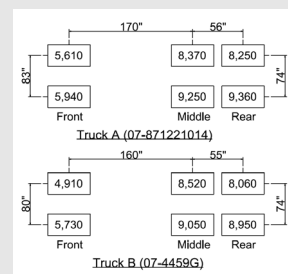
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Load Testing Using Strain Gauges



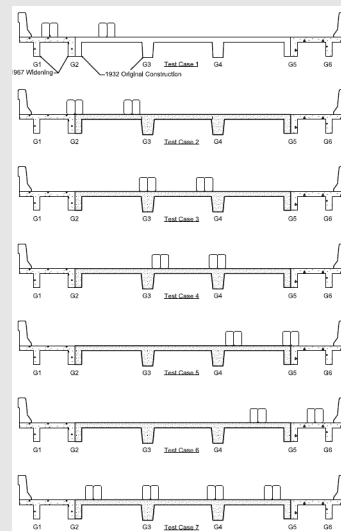
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Load Testing Using Strain Gauges



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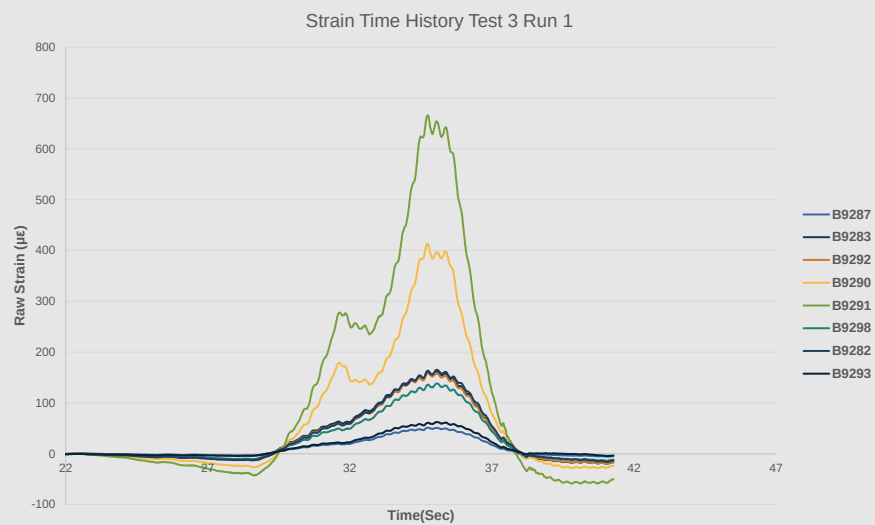
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Load Testing Using Strain Gauges



- Linearity
- Reproducibility
- Sensor Behavior



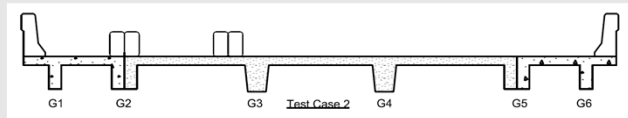
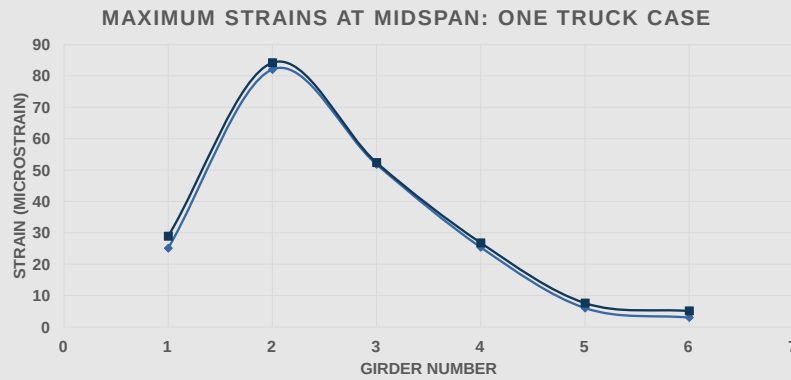
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Load Testing Using Strain Gauges



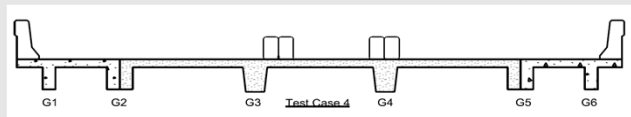
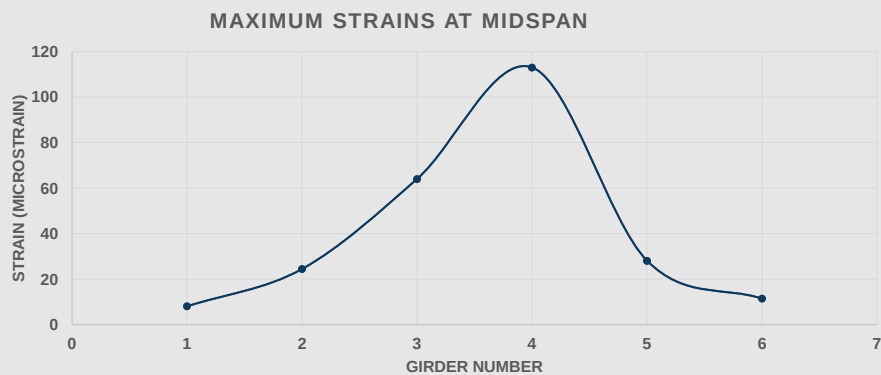
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Load Testing Using Strain Gauges



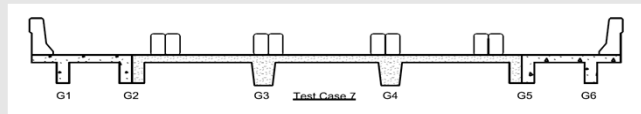
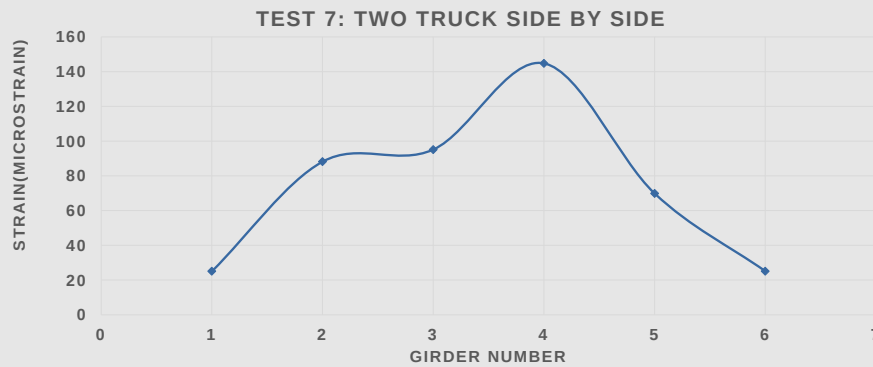
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Load Testing Using Strain Gauges



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Load Testing Using Strain Gauges



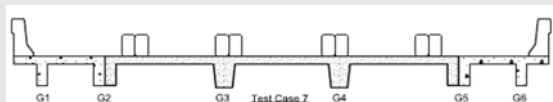
$$RF_T = K \times RF_C \quad \text{AASHTO MBE Eqn. 8.8.2.3-1}$$

$$K = 1 + k_a k_b \quad \text{AASHTO MBE Eqn. 8.8.2.3.1-1}$$

$$k_a = \frac{\epsilon_c}{\epsilon_T} - 1 \quad \text{AASHTO MBE Eqn. 8.8.2.3.1-2}$$

	K-Factor
Widened Beam G2, G5	1.345
Interior Beam G3, G4	1.166

- Controlling Rating Factor Before Load Testing, $RF_C = 0.83$
- Controlling Rating Factor After Load Testing, $RF_T = 1.05$



- Load Posting was removed with the increase in load rating

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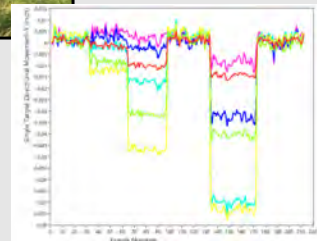
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Example: Load Testing Using DIC Techniques

- Targets are installed on the bridge
- Cameras focused on targets
- Close the bridge to traffic
- Load the bridge
- Open bridge to traffic
- Process the Data



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Load Testing Using DIC Techniques

- Place cameras 40'-110' from targets



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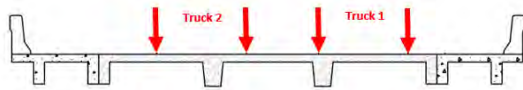
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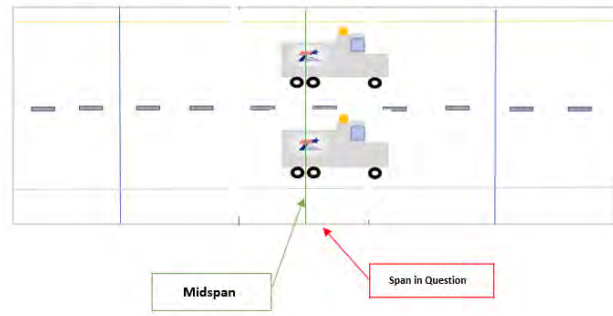
Load Testing Using DIC Techniques

- Consider various loading configurations

DIC Load Test Case 3 Wheel Positions



Load Test Case #3



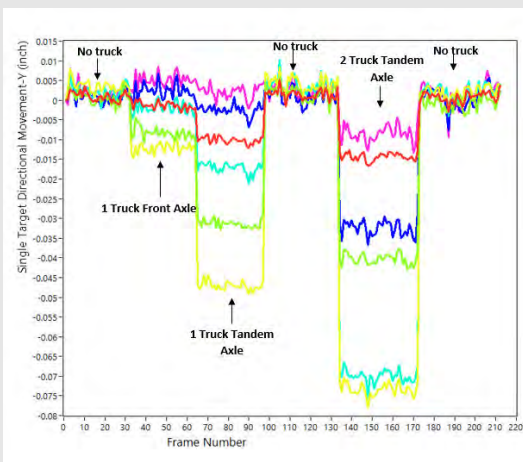
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Load Testing Using DIC Techniques



	Deflections (in.)					
	G1	G2	G3	G4	G5	G6
Test Case 1	0.0028	0.0028	-0.0041	-0.0158	-0.0091	-0.0023
Test Case 2	-0.0002	-0.0002	-0.0193	-0.0507	-0.0321	-0.0111
Test Case 3	-0.0108	-0.0108	-0.0738	-0.0776	-0.0420	-0.0159

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Load Testing Using DIC Techniques



- Example: US 84 WB over Hords Creek
- AASHTO DF for Exterior Girder: 0.58
- Load Test DF for Exterior Girder: 0.50
- 16% improvement in Load Rating
- Load Posting was removed with improved Load Distribution

$$LLDF = \frac{\Delta_i I_i}{\sum (\Delta_i I_i)}$$

Where, LLDF is the live load distribution factor based on midspan deflections, Δ_i is the deflection of each girder, I_i is moment of inertia of an individual beam.

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Load Testing Using DIC Techniques



- Achievements
 - Set-up is easy and can be performed within 1-2 hrs
 - 3 bridges were load tested in one day
 - Total road closure typically lasts 10-15 mins
 - Reliable results



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Load Testing Using DIC Techniques



- Lessons learned
 - Site preparation
 - Plan for weather and light conditions
 - Available right-of-way
 - Distance and angle
 - High traffic areas
 - Communication with all parties involved

